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TEN YEAR RESURVEYS OF THE BIODIVERSITY OF MARINE COMMUNITIES AND INTRODUCED SPECIES IN PEARL HARBOR, HONOLULU HARBOR, AND KE‘EHI LAGOON, O‘AHU, HAWAI‘I

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Final Report prepared for the Department of Defense Legacy Program

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EXECUTIVE SUMMARY

The marine and estuarine algae, invertebrate, and fish communities in Pearl Harbor, Honolulu Harbor and Ke‘ehi Lagoon Oahu, Hawai‘i were surveyed between October 2007 and April 2008 for a comparison of the biotic communities with results determined by previous surveys in Pearl Harbor in 1996 (Coles et al. 1997) and Honolulu Harbor-Ke‘ehi Lagoon in 1997 (Coles et al. 1999b). Both the 1996 Pearl Harbor study and the present study were conducted under the auspices and funding provided by the Department of Defense (DoD) Legacy Resource Management Program, which provides financial assistance to DoD efforts to preserve our natural and cultural heritage. The program assists DoD in protecting and enhancing resources while supporting military readiness while maintaining biological diversity and sustainable use of land and water resources for mission and other uses.

For the present study samples were taken and observations were made at fourteen stations at or near fifteen stations previously surveyed in Pearl Harbor and six stations in Honolulu Harbor-Ke‘ehi Lagoon. Organisms were identified to species or the lowest practicable taxonomic level, and results were added to the lists determined by the previous study and other published and unpublished marine biological surveys conducted in Pearl Harbor, published taxonomic descriptions of organisms collected from the harbor and Pearl Harbor specimens cataloged in the Bernice P. Bishop Museum collections.

In addition to sampling and observations at the former collection stations, snorkeling surveys were conducted throughout Pearl Harbor and Ke‘ehi Lagoon to estimate the abundance of introduced algae and in Pearl Harbor to document the occurrence of reef corals. An observer, either towed on a “Manta Board’ or swimming freely, semi-quantitatively estimated abundance of *Acanthophora spicifera* and *Gracilaria salicornia* and other introduced invasive algae approximately every 50 m and recorded the location of observations using a GPS unit. Another snorkeling observer also recorded by GPS the locations of reef corals that were identified to species and photographed. The results from both data series were mapped using ArcGIS 9.1.

This study collected or observed a total of 298 species or higher taxa from the 14 stations sampled in Pearl Harbor and 195 in Honolulu Harbor-Ke‘ehi Lagoon.. Dendrographs based on Sorensen Indices of Similarity of species composition among stations indicate clustering of sites based on the physical environments of the sites, which is also reflected in the patterns of species richness. Sites located near harbor mouths had the most taxa, reflecting the oceanic conditions that support the presence of organisms characteristic of both harbor and reef environments, while fewest taxa occurred at sites furthest within Pearl Harbor and Ke‘ehi Lagoon characterized by sluggish, highly turbid conditions and dominated by mangroves. The harbor mouth locations were also where the greatest number of the 91 new species reports for Pearl Harbor and the 41 new reports for Honolulu Harbor-Ke‘ehi Lagoon occurred.

Ninety-six genera or species, or 32%, of the total taxa found in Pearl Harbor, are previously designated or newly reported as introduced or cryptogenic (i.e. of uncertain geographic origin). For Honolulu-Ke‘ehi Lagoon 68, or 35%, of the total taxa are designated introduced or cryptogenic. These values are comparable to but somewhat higher than the percentages determined for the 1996-97 studies in the

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same harbor areas, but the higher values are probably related to smaller samples sizes taken in the present study than previously, which reduced the total number of total taxa reports. However the higher numbers do indicate wide distribution of introduced and cryptogenic species throughout the harbors and lagoon, reflected in that most stations had higher percentages of introduced and cryptogenic than the overall averages. Only 17 of the genera or species found in the study, mostly sponges, were new reports for Hawaiian waters and these were tentatively designated as cryptogenic.

Only seven of the 95 introduced or cryptogenic genera or species that occurred in Pearl Harbor or the 68 in Honolulu Harbor-Keʻehi Lagoon are considered invasive, i.e. have been found to substantially alter the environments of their area of introduction or interfere with the survival and propagation of native species. These invasive species include the red mangrove *Rhizophora mangle*, two red algae *Acanthophora spicifera* and *Gracilaria salicornia*, the orange keyhole sponge *Mycale armata*, the snowflake octocoral *Carijoa* aff*. riisei*, the Caribbean barnacle *Cthamalus proteus* and the Asian stomatopod *Gonodactylaceus falcatus*. With the exception of the red mangrove, which was first reported on Oʻahu in 1922, all of these are recent introductions to Hawaiian waters that have proliferated in the last 30 years and either monopolize habitat space in their habits of introduction, pose a potential threat to native organisms in those habitats, or both. All seven have become dominant organisms elsewhere in Hawaiʻi where they have various degrees of invasiveness depending on local conditions, but it is the red alga *Gracilaria salicornia* that is the most problematic in both the present study locations and elsewhere in HawaiʻI and especially on Oʻahu.

Gracilaria salicornia was first introduced to Oʻahu in 1971 and again in 1978 and has since become the most invasive algal species in shallow shoreline areas along south Oʻahu and throughout Kāneʻohe Bay. At the time of the 1996 Pearl Harbor Legacy study it was found to be moderately abundant in shallow depths at only three of the 15 sampling and observation sites, although it was known to be established at the heads of all three lochs as early as 1946. For the present study it was found to occur at 10 of the 14 stations in Pearl Harbor and one in Keʻehi Lagoon, where it did not occur in 1998. Moreover, it is now the dominant benthic organism throughout all of Pearl Harbor where shorelines have not been altered to vertical piers or jetties or it is too turbid to allow growth of this alga. Snorkeling survey observations found *G. salicornia* at 72% of 1215 sampled locations throughout the harbor, with 34% of the total having three dimensional dense mats, 24% with abundant coverage and 14% with low or patchy coverage. Only 8% of the locations surveyed had no *G. salicornia* present. In Keʻehi Lagoon abundance was lower, with less than half of the locations having G*.salicornia* present and only 1.8% having abundant mats. However, the other invasive alga surveyed, *Acanthophora spicifera* was more abundant in Keʻehi Lagoon than Pearl Harbor, occurring at 652 (83%) of the 778 locations, with 553 (78%) of those having low or patchy *A. spicifera* cover. *Acanthophora spicifera* is apparently highly stress resistant, being the only alga and one of the few organisms found growing in highly turbid conditions on fine silt among mangrove roots at the head of West Loch in Pearl Harbor.

The findings of the present study support the conclusion from the 1996 Legacy study that environmental physical conditions in the Pearl Harbor have improved since naval shipboard effluent release ceased in the 1970s and most sewage discharges were removed in the 1980s. The last of these, the Fort Kamehameha outfall that discharged into the main ship channel was closed in 2005. The present study

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found considerably more organisms representative of less organic-rich conditions than the 1996 survey, with most of these occurring in areas of higher water circulation along the main channel and loch entrances. This and other recent surveys have found considerable numbers of reef corals and previously unreported species in addition to those that appeared to be beginning to colonize hard substrata in the harbor in 1996, and many previously unreported reef-associated invertebrates were found in the present study. The present study also found previously unreported reefs of *Porites compressa* well into West Loch that have apparently existed for at least decades, contrary to conclusions from studies conducted in the 1970s that no reef corals were present in Pearl Harbor in the early 1970s

Unfortunately, the improved environmental conditions that have developed in Pearl Harbor in the last two decades are being negated by the proliferation of the invasive alga *Gracilaria salicornia* and to a lesser extent, the alga, *Acanthophora spicifera*, and the sponge *Mycale grandis*. The 1996 Legacy study found "no indication of monopolization of resources by a single species or population outbreaks of a recently introduced species." This is clearly not the case now. *Gracilaria* and *Acanthophora* cover large areas and exclude other benthic organisms throughout Pearl Harbor and much of Keʻehi Lagoon, similar to their explosive spreading and growth in the last decade along much of Oʻahu's south shore and in Kāneʻohe Bay. *Mycale grandis* overgrowth threatens the survival of the apparently long-standing *Porites compressa* reefs recently discovered in West Loch, where other similar reefs have already been lost to *Gracilaria*. These invasive species are apparently preventing the possible recovery of biotic conditions that have probably not existed in Pearl Harbor since pre-European contact.

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INTRODUCTION

A. Historical Perspective

The harbors of the south shore of O‘ahu have played a principal role in shaping the history of the Hawaiian Islands since the late 18th century when European contact with Hawaiians first occurred. The main Hawaiian Islands are the most isolated major island group in the world, lying more than 2666 miles (4300 kilometers) from the nearest major landfalls in North America and the South Pacific and more than 3968 miles (6400 kilometers) from Japan, the nearest Asian land mass. Prior to the arrival of Europeans to the Islands in the late eighteenth century, the only vessel movement was between neighboring islands or by infrequently arriving Polynesian canoes from the South Pacific.

This isolation of Hawai‘i from the rest of the world rapidly decreased through the 19th century. In the 81 years after European discovery of the Hawaiian Islands in 1778, more than 300 ships from foreign ports made landfall in Hawaii, with the maximum number of arrivals (78) occurring in the 1840s, coinciding with the peak of whaling activity and the discovery of gold in California (Judd 1920). This was only the beginning of Hawaii’s interaction with the outside world, and shipping traffic continued to increase as steam replaced sail and Hawai‘i commercial and shipping requirements expanded with urbanization and development of the plantation-based economy.

This increased ship movement and requirement for harbor and port facilities occurred first in the Honolulu Harbor and then Pearl Harbor, both of which provided natural deep water ports that were later expanded and modified for the increased ship traffic that occurred with expanding populations, commercial development and military presence on the island of O‘ahu. Honolulu Harbor was the focus of commercial ship traffic and, until the completion of the Kaleloa (Barber’s Point) Deep Draft Harbor in 1985, provided the only docking and offloading facilities for shipping to the city of Honolulu and for interisland transport to the neighbor islands. Pearl Harbor became a focus of naval operations for U.S. Navy operations in the Pacific after its establishment as a coaling station and dry-dock at the beginning of the 20th century. Although its access has been restricted from commercial traffic, it nonetheless has long been a site of major movement of military vessels of all sizes, especially since before World War II in the late 1930s and 1940s.

The histories of the two harbor areas and of Ke‘ehi Lagoon, which was highly modified in the early 1940s to accommodate seaplane runways, are described in detail in Coles et al. (1997, 1999a) for Pearl Harbor and in Coles et al (1999b) for Honolulu Harbor-Ke‘ehi Lagoon, and detailed chronologies of important events in the histories of each harbor are provided in appendices in the Coles et al 1997 and Coles et al 1999b reports. No further detail will be provided here other than to note that modification and development of both harbors and of Ke‘ehi Lagoon have had extensive and far reaching impacts on the environment and the ecology of marine communities at those locations.

B. Environmental Characteristics

Pearl Harbor

Pearl Harbor is a coastal plain estuary located between the Koʻolau and Waianae mountain ranges in central Oʻahu, Hawaiʻi (Figure 1). The harbor is the most landlocked large estuarine body of water in the Hawaiian Islands and has about 8 square miles (21 square kilometers) of surface water area with a mean depth of 29.2 m and about 58 km of shoreline. It is divided into three main lochs (East, Middle and West Lochs) and one smaller loch (Southeast Loch), which are remnants of drowned river valleys joined together by a main channel connecting the harbor with the open ocean. With this relative isolation of the harbor from oceanic circulation, water exchange of the harbor with the open ocean is relatively slow, and residence time of water within the harbor has been estimated as about six days maximum for bottom water and one to three days for surface water (Grovhoug, 1992).

Water temperature in the harbor varies annually from 23 to 29^{o}C, and salinities have ranged from 10 to 37% (mean 33%). Salinity is highly influenced by terrestrial and ground water runoff, especially at the heads of the three main lochs. The harbor receives five perennial streams and three intermittent streams draining approximately 109 square miles (285 square kilometers) of watershed and the discharges from five large springs along the lochs' shorelines. Warming of surface water and freshwater discharge contributes to the development of a pronounced vertical stratification of harbor waters, which in turn promotes differing current conditions between surface and bottom and relative isolation between surface and bottom water masses. Surface water circulation is primarily offshore and driven by tradewinds, while weak tidal flood and ebb flows of 0.15-0.3 m/s control the movement of bottom water in and out of the harbor (Grovhoug, 1992).

Vegetation along much of the West, Middle and East Loch shorelines is dominated by introduced mangroves (*Rhizophora mangle*) at the heads of the three main lochs, which has formed dense growths of bushes and trees up to 10 m high. Elsewhere the shoreline vegetation is cultivated grass, trees and plants in populated areas and kiawe trees (*Prosopis* sp.) along channels. Where mangroves do not occur and the shore has not been altered by construction or dredging the nearshore subtidal zone is largely either vertical concrete walls or a shallow consolidated reef platform to about 2 m depth, which is often covered with fine sediments and, in recent years, introduced macroalgae. Further offshore the substratum slopes deeply to bottom covered with a thick layer of fine silt or mud.

The water of Pearl Harbor has apparently always been relatively turbid from stream runoff and other sources of sediment. A traditional Hawaiian chant recites "Ewa's lagoon is red with dirt/…A plumage red on the taro leaf/ An ocherous tint in the bay" (Emerson, 1909). However, runoff related sedimentation undoubtedly increased dramatically in the nineteenth century with deforestation, ranching and grazing of hillsides, declining use of taro ponds which would act to retain storm water, and development of sugar cane cultivation. S. Bishop (1901, in Sterling and Summers, 1978) described her memories of Pearl Harbor of 1836: "The lochs or lagoons of Pearl Harbor were not then as shoal as now. The subsequent occupation of the uplands by cattle denuded the country of herbage and caused vast quantities of earth to be washed down by storms into the lagoons…" This resulted in the harbor historically being a highly turbid environment, with thick deposits of fine silt on the bottom throughout most of the lochs. Stream

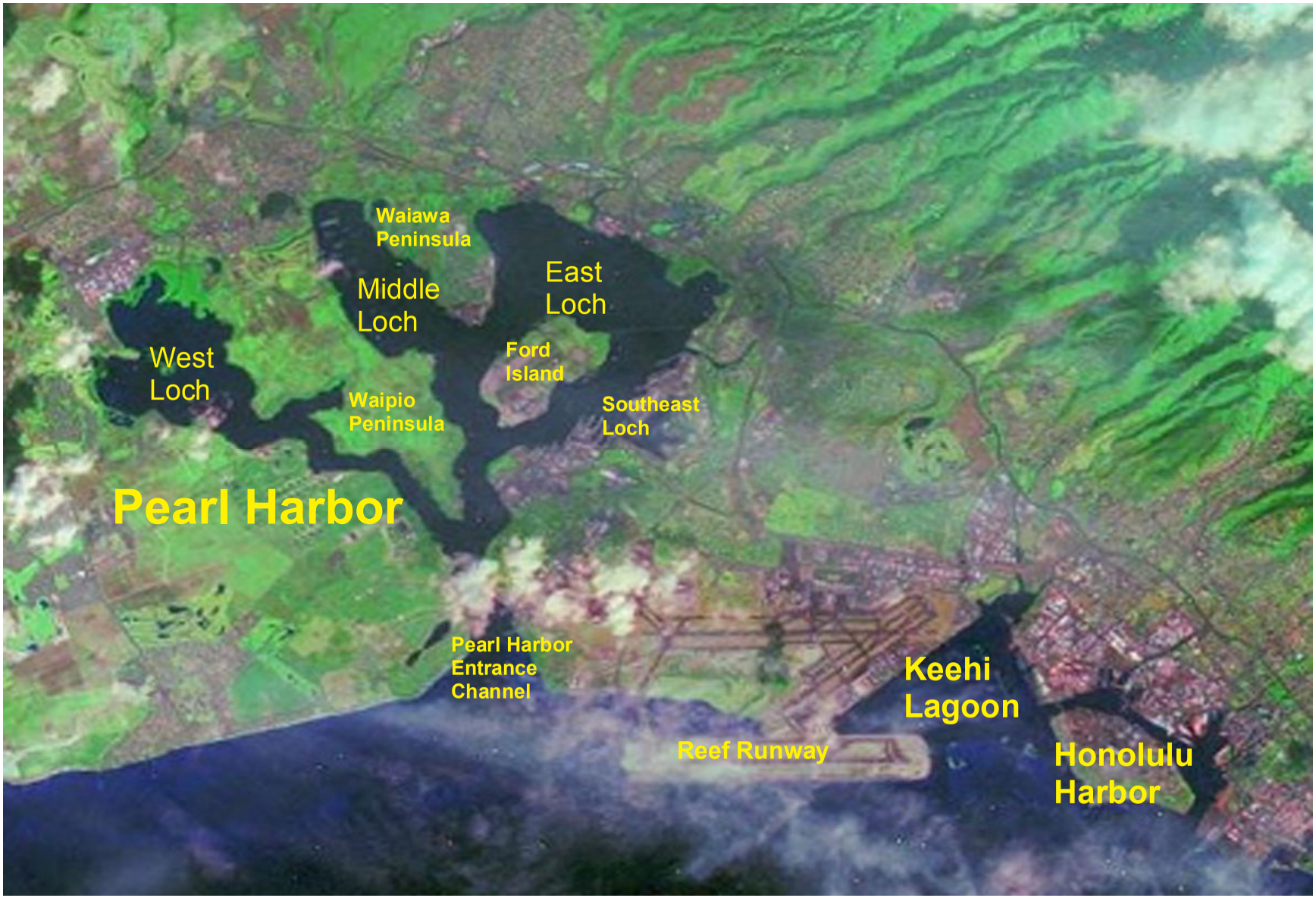

Figure 1. Aerial perspective of Pearl Harbor, Honolulu Harbor and Ke‘ehi Lagoon. Source: http://terrainemap.com.

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input of sediments has been estimated to exceed 96 thousand tons annually, and maintenance dredging of about nine million cu. yd. has been required by the Navy on four to five year cycles (Nystedt, 1977 in Grovhoug, 1992). Turbidity measurements indicated by Secchi disk readings in 1990 averaged only 2.5 harbor-wide, resulting from suspended sediments and organic material produced by eutrophic conditions (Grovhoug, 1992).

Early reports describe an abundance of fish and shellfish in Pearl Harbor and the importance of the area as a major Hawaiian population center supported by numerous and extensive fish ponds. According to Handy and Handy (1972) the bays of the harbor "offered the most favorable locality in all the Hawaiian islands for the building of fish ponds and fish traps into which deep sea fish came on the inflow of tidal water…(the bays) provided a greater variety and abundance of edible shellfish, and were famous as the summer home of mullet". Like many aspects of the Hawaiian culture, fish traps and fishing in the harbor declined in the nineteenth century. However, more than 30 fish traps still existed by the early 1930s (Costa-Pierce, 1987, Figure 2) and oysters introduced in the 1920s thrived for a time.

Since early in the 20th century, Pearl Harbor has been the center of Pacific Naval Operations and the Pearl Harbor Naval Base, with berthing and maintenance facilities for hundreds of ships. As part of this effort the harbor entrance channel was deepened from its natural depth of about 5 m to 9 m, widened to approximately 60 m, and opened to military ship traffic in 1911. Many nearshore habitats were soon drastically altered as shorelines, especially in Southeast Loch and around Ford Island, and were converted to docks and naval operations facilities. Formerly shallow areas were dredged to accommodate ship traffic, and fish ponds in the vicinity of the naval base were filled with dredge spoils. Urbanization of the East Loch area progressed as the Pearl City area was developed, and the Hawaiian Electric Company's Waiau Power Station began discharging heated effluent at the head of the harbor's East Loch in 1938. In addition, two recreational marinas were placed in the harbor at Iroquois Point near the channel entrance and at Rainbow Bay at the head of East Loch.

From 1940 to 1970, Pearl Harbor ship traffic and shipyard activities were at their peak and the environmental quality of the harbor reached its lowest point. Alteration of the shoreline and near-shore areas in the harbor continued, and all but four of the more than 30 fish ponds that had still remained in 1920 were eliminated. Development of the naval base and urbanization of the watershed areas greatly altered the shoreline and quality of water entering the harbor in this century. At one time more than 100 treated or untreated sewage discharges were estimated to enter the harbor, and coliform bacterial levels indicated extremely polluted conditions. Sewage discharge from naval facilities reached an average 24,000 m^3/day and City and County of Honolulu sewage discharges averaged 34,000 m^3/day in the early 1970s (Evans et al. 1972). The high organic load and polluted conditions that existed at that time were indicated by depressed bottom water oxygen concentrations, especially toward the heads of West and Middle Lochs where sewage outfalls were still in operation (Evans, et al., 1974). Extreme dissolved oxygen lows for bottom water fell to 0.1 ppm, with annual averages as low as below 1.5 ppm at these sites, compared to surface values or bottom water in the channels that generally remained around 6 ppm. Heavy metals and pesticides in sediments indicated further environmental degradation Non-point

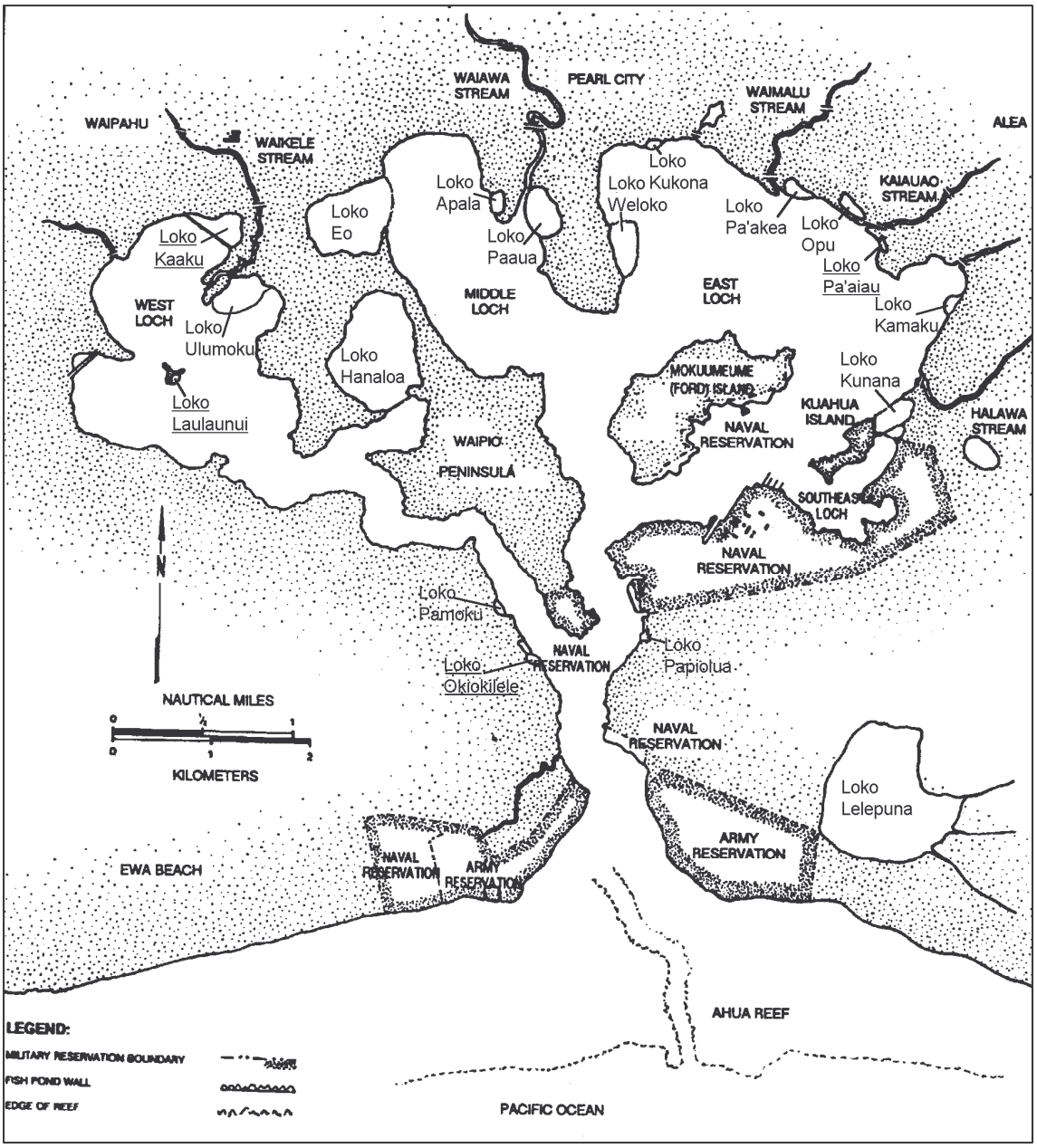


Figure 2. Pearl Harbor in ca. 1920, showing many of the fish ponds that still remained after the initial development of the naval base. Of these only the four underlined still existed in 1972 (adapted from Grovhoug, 1992 and based on an undated O‘ahu Fisheries chart).

pollution sources from hillsides under urban development and naval shipyard activities further degraded water quality. Coliform bacterial counts at stream mouths in East Loch and near oyster beds in West Loch ranged from hundreds of thousands to billions of bacteria per 100 ml (Cox and Gordon 1970). Possibly because of such a ready, albeit polluted, supply of particulate food, the oyster population soared, reaching an estimated 36 million oysters in West Loch in the 1960s. However, this was followed by a massive die-off of 99% of the oyster population in West Loch and a fish and invertebrate kill in Middle Loch in 1972 (Kawamoto and Sakuda 1973).

These polluted conditions have been largely abated with the removal of sewage effluents from the harbor and changes in naval operations (Grovhoug 1992). In 1975 the Navy instituted shipboard wastewater collection, holding and transfer tank systems to replace release of vessel wastewater effluents into the harbor. Between 1982 and 1984 sewage effluent discharge ended from all major sources (Grovhoug 1992) except for the Fort Kamehameha outfall that discharged treated sewage into the main channel near the harbor entrance until January 2005, when the point of discharge was moved outside of the harbor entrance to a depth of 45 m in Mamala Bay. Sediment and pesticides from sugar cane production decreased through the years, ending in the 1990s, urbanization of hillsides of the East and Middle Loch watersheds moderated as developments were completed, and better land management practices during construction helped to alleviate surface runoff-related sedimentation. Generally, Pearl Harbor water quality was indicated to have generally improved substantially since its low point in the 1970s. A 1990 study in the East and Southeast Lochs indicated that water quality parameters were within state water quality standards, that there was no substantial difference between surface and bottom water oxygen concentrations, and that metal concentrations in sediments were significantly less than 1972 values for most metals (Grovhoug 1992). However polychlorinated biphenyl (PCB) concentrations were substantially elevated in the Southeast Loch shipyard area at that time (Grovhoug 1992), and and urbanization related pollutants from additional road surfaces and automobile usage has probably increased from the Pearl Harbor watershed.

Two major petroleum hydrocarbon spills have occurred in Pearl Harbor, one of 100,000 gallons of aviation fuel at the head of Middle Loch in 1987 (AECOS 1987) and one in 1996 of an estimated 39,000 gallons (982 barrels) of bunker fuel oil from the Chevron pipeline supplying the HECO power station at the head of East Loch. The 1987 spill produced leaf yellowing, defoliation and some mortality on about 9.5 acres of mangroves (*Rhizophora mangle*) along the Middle Loch shoreline (AECOS 1987). The 1996 spill resulted in intense oiling of the intertidal flats at the point of discharge near the HECO station intake, and deposition of oil and tar in the intertidal zone along the shores of Ford Island and Waipio Peninsula that were in the direct path of the oil spill. Although initial mortality to marine organisms or birds was only four pufferfishes and two prawns, other organisms within the intertidal were directly exposed to oil and tar deposits which remained after the initial spill. The long term consequences of this spill on the intertidal and other communities in Pearl Harbor were apparently minimal and are briefly described in Brock (2007).

Opportunities for species introductions into Pearl Harbor have existed since the first Polynesians came to O‘ahu and have continued to the present, and colonizing organisms could have established themselves for the last half century from hull fouling or discharge of ballast water by ships within the harbor as part of their normal operations. The probability of such introductions probably increased with the deepening and

widening of the entrance channel in the first decade of the 20th century, and reports of the ratio of newly reported introduced to native species increased during the war time related increased ship traffic (Coles et al. 1999a). Also, an event which triggered substantial renewed interest in species introductions into the harbor was the relocation of the floating dry-dock *Machinist* from Subic Bay, Philippines in 1992. In correspondence and public affairs releases the Navy affirmed that the hull had been thoroughly cleaned and inspected before leaving the Philippines and the dry-dock deballasted at sea, that water from ballast tanks had been microscopically inspected for pathogens, and that the hull had been inspected and additional cleaning performed on arrival. However, a number of newly reported species were found on the drydock and elsewhere in the harbor in 1996 that may have been brought on its surface as fouling. The drydock was later relocated to Apra Harbor on Guam in 1999 (DeFelice 1999) and was noted to bring a number of newly introduced organisms, most of which did not become established there (Paulay et al. 2002).

Honolulu Harbor and Keʻehi Lagoon

Honolulu Harbor (Figure 3) originally was a deep embayment formed by the outflow of Nuʻuanu Stream creating an opening in the shallow coral reef that lies along the south shore of Oʻahu. It was first described scientifically by Agassiz (1889) as "nothing but a channel kept open by the flow of the Nuʻuanu River, which…has killed the corals in its path, scouring at the same in freshets the whole harbor and the adjacent limestone forming the channel…. The stream forming the original Honolulu Harbor basin brings down a large amount of volcanic mud in its short course, and has deposited this in the harbor and channel, so that there appears to be nothing but dark volcanic mud for a considerable distance towards the entrance to the channel, where the coral limestone reappears."

In its natural state the harbor consisted only of this river-formed main basin, which was only 6 m deep at its entrance. Its perimeter was enclosed by shallow reef and intertidal areas that were exposed at low tide. A small white sand beach extended along the eastern shoreline from the present Aloha Tower complex to the Pier 1 area. The reef extended across the present Kapālama Channel continuous with the area that is now Sand Island. Formerly this was a much smaller island (Immigration Island) surrounded by a large shallow reef flat.

Honolulu Harbor now consists of a main basin which has been substantially enlarged and deepened from the original natural embayment, Kapālama Channel, which was first dredged through the reef west of the main basin in 1915-20, and Kapālama Basin, first dredged to 10.6 m depth in 1941-45 (Figure 3). The harbor receives the runoff of two major fresh water sources, Nuʻuanu Stream at the head of the original harbor between Piers 15 and 16, and Kapālama Canal which empties into Kapālama Basin between Piers 38 and 39. The harbor originally had only one opening to the sea until the Kalihi Channel was completed in 1962, and the presence of this channel at the west end of the harbor has undoubtedly increased circulation and water quality. Limited salinity data (Oceanit 1990) suggests that surface salinities can be reduced in the harbor by freshwater runoff by as much as one third, but subsurface salinities remain at an oceanic 35 ^{o}/oo. Overall average salinities in the harbor average 34 ^{o}/oo (Buske and McCain 1972).

The present harbor ranges in depth down to 13.5 m, maintained by periodic dredging. Very little natural substrata remain in the harbor. Extensive modifications by dredging and filling have greatly enlarged the deeper areas of the harbor and reduced the reef flats that enclosed the original main basin. More than 50 piers compose most of the shoreline throughout the harbor, and the original entrance channel is lined and reinforced with large basalt boulders. Natural coral reef substratum occurs only in two places in the harbor, between Piers 29 and 30 on the landward side of Kapālama Channel and on both sides of Kalihi channel. Elsewhere the benthic substratum above the silt or sand bottom is composed of concrete abutments or pilings supporting docks and piers, many of which jut out 10-25 m from the dredged shoreline. The bottom of most of the harbor is composed primarily of flocculent loose silt or mud, which becomes finer near the mouths of Nu‘uanu Stream and Kapālama Canal. However, with approach to the harbor entrance at Piers 1 and 2 the bottom sediments become fine, white calcareous sand, as described by Agassiz (1989) over a century ago.

Honolulu Harbor remains the primary shipping port for commercial goods entering Honolulu or being trans-shipped to the neighbor islands, and port activity is dominated by container ships unloading at the Matson and Maersk Sealand Terminals at Pier 52 on Sand Island. Just eastward Pier 53 provides berthing for U.S. Coast Guard ships, and the University of Hawai’i berths its fleet of research vessels at Snug Harbor, near the Kalihi Channel entrance. Pier 2 is the foreign trade zone docking area, and cruise ships that transport thousands of passengers utilize Piers 10 and 11. Commercial fishing boats moor at Piers 16-18, and Piers 19-27 are berths for harbor and inter-island tugs. While in operation, the Hawai‘i Superferry utilized docking facilities at Piers 22-23 for interisland transport of passengers and vehicles. The Clean Islands Council oil spill emergency response vessels dock at Pier 35, Young Brothers interisland tugs and barges utilize Piers 38-40, and a floating dry dock is in place at Pier 41. Although wastes from the pineapple canneries were originally discharged into Kapālama Canal until the early 1970s, resulting in some of the highest bacterial concentrations measured in the state waters at that time (Cox and Gordon 1970), the only significant industrial use of harbor water at the present time is for once-through cooling of the Hawaiian Electric Generating Station. This facility has, in the past, raised the temperature of up to 200,000 gpm cooling water 5-6°C circulating from its intake by Pier 7 to its discharge at Pier 5, but discharge of thermal effluent has decreased in recent decades as generation load has been shifted to more efficient newer power stations.

Ke‘ehi Lagoon (Figure 3) was originally a large shallow reef and subtidal area no more than 1-2 m deep that extended more than two miles off the mouths of Kalihi and Moanalua Streams. Its present eastern boundary is formed by Kalihi Channel, which was originally a shallow channel across the reef through which the combined outflow of Kalihi and Moanalua Streams reached the sea. Much of the present land for Honolulu International Airport was originally reef, Ke‘ehi Lagoon shoreline, ponds or marshes.

Dredge and fill activities in the 1940s and the 1970s drastically altered Ke‘ehi Lagoon from its original state. A mooring basin and three seaplane runways two to three miles long by 30.3 m wide and 3 m deep were dredged in the lagoon in 1941-45 and the dredged material placed along the shore. Because these channels essentially trapped water that otherwise would have moved on and off shore with tidal exchange and wide movement, stagnant conditions and lowered water quality resulted, retaining pollutants in the deeper water in the runways.

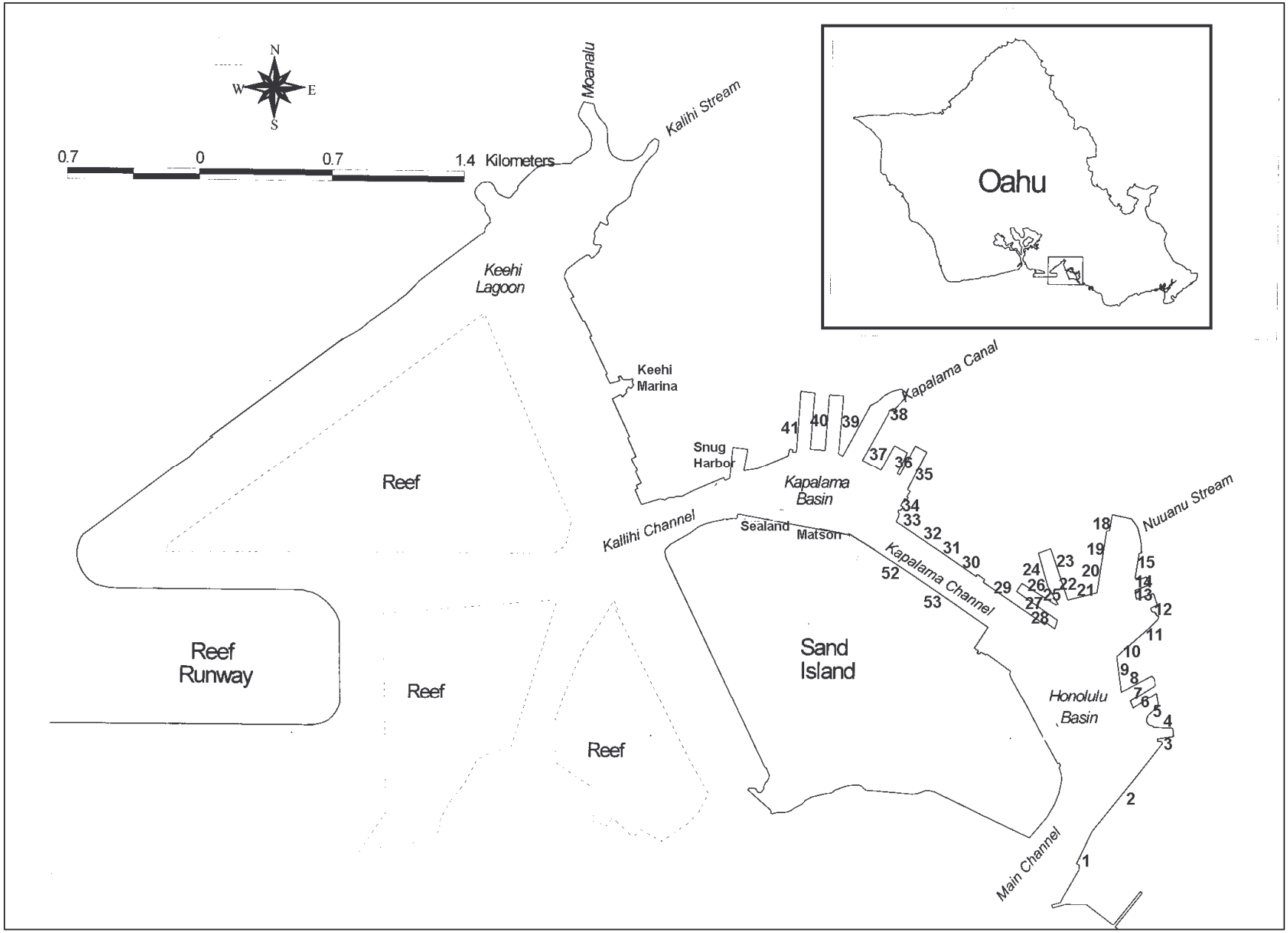


Figure 3. Map of Honolulu Harbor and Ke‘ehi Lagoon showing Pier locations.

Further alteration of the lagoon resulted from the construction of the Honolulu International Airport Reef Runway, constructed in 1972-75. This effectively divided the lagoon into an eastern portion extending from the east end of the runway to the Kalihi channel entrance, and a western portion adjoining the Hickam small boat harbor. In the process of constructing the runway, some 1,240 acres of former reef and shallow flats were buried under 2.7 m of fill material. Also, to increase circulation and provide boat access, channels were dredged around the eastern end of the runway to the seaplane runways and to Hickam Harbor. Monitoring conducted prior to and following completion of the runway construction indicated a substantial improvement in water quality due to the increased circulation provided by these channels (Environmental Consultants 1977, 1979; OI Consultants 1986; Noda & Assoc. 1978).

The eastern portion of Keehi Lagoon sampled in this study consists of a shallow reef flat enclosed by the three seaplane runways, the Kahili Entrance Channel to Honolulu Harbor and the access channel east of the reef runway that was dredged in 1971-75. The lagoon receives the combined drainage of Kalihi and Moanalua Streams on its north apex, which is completely lined with a dense growth of red mangrove (*Rhizophora mangle*). A series of small islands line the northeast-southwest seaplane runway, and more are forming on the central reef flat where mangroves grow and accumulate sediments.

C. Study Objectives

Pearl Harbor has a substantial information base for marine organisms that dates back to the 19th century that was reviewed in Coles et al. 1997, Coles et al. 1999a and Coles 2006. Although collections were made intermittently in 1920s, 1930s and early 1940s, the first comprehensive and extensive surveys were made in the early 1970s by the Naval Undersea Center (Evans et al. 1974). This was the primary baseline of comparison for the comprehensive survey conducted in 1996 for the Department of Defense Legacy Project Number 106 that described environmental conditions and the biota in Pearl Harbor at that time, with an emphasis on introduced marine species (Coles et al. 1997). This project determined that in Pearl Harbor 96 out of a total of 434 marine species, or 22%, were introduced or cryptogenic (i.e. of indeterminate) origin. Comparable figures for a 1997-98 study in Honolulu's commercial and public harbors, including Honolulu Harbor and Ke'ehi Lagoon were 100 introduced or cryptogenic species of a total of 585, or 17%. These introduction percentages are among the highest of any areas that have been surveyed in the world, suggesting that O'ahu's harbors have historically been major recipients of introduced marine species and a possible point from where they may have been distributed elsewhere in Hawaii.

The other major finding from the 1996 Pearl Harbor Legacy project was that reef corals, formerly considered missing from Pearl Harbor due to earlier poor water quality, were becoming re-established in the harbor. Subsequent studies by the Pearl Harbor Naval Facilities Engineering Command (Smith 2002, Smith et al. 2006) verified the increasing occurrence of corals within the harbor but noted that the invasive introduced alga *Gracilaria salicornia*, first reported in Pearl

Harbor by the 1996 Legacy surveys, was also becoming very abundant and overgrowing corals that had become recently established.

The present study was designed to compare environmental conditions and the marine biota in Pearl Harbor with the results of the 1996 surveys using similar sampling sites, sampling methods, and the same project manager as for the previous study, and to compare these results with those obtained for a few selected sites in Honolulu Harbor and Keʻehi Lagoon that were surveyed in 1997. The sites surveyed in Pearl Harbor included those of the 15 stations surveyed in 1996 that were accessible in 2007-2008, and six sites in Honolulu Harbor or Keʻehi Lagoon of the 20 that were surveyed in 1997. The results of these surveys conducted after ca. ten years were to be evaluated to determine whether biotic conditions in the harbors had changed substantially, especially in terms of the relative abundance of introduced or invasive species. Also, comprehensive observations throughout Pearl Harbor and Keʻehi Lagoon were made beyond the locations of fixed sampling sites to determine the extent and impact of introduced invasive algae and the extent of occurrence of reef corals that have become established in areas formerly considered unsuitable for their survival.

METHODS

Sampling and observations of biota were made at or near 14 of the 15 Pearl Harbor stations previously surveyed in 1996 and were intended to duplicate, wherever possible, the locations of stations previously surveyed. Station locations are shown in Figure 4, and the dates, coordinates, and depths of the stations are in Table 1. Station 3, surveyed in 1996, was not resurveyed because of warnings from the Hawaiʻi State Department of Health that diving in Walker Bay could be hazardous to divers having full body exposure to the water in the bay. The 1996 West Loch Stations 4 and 5 could not be resurveyed at the same locations because water at these sites was too shallow to access by boat and/or too turbid to see the bottom, so new Stations 4A and 5A were established 600-750 m SE of the original locations. Access to the 1996 Station 6 adjacent to Drydock 4 was restricted in 2008 by U.S. Navy security, so an adjacent site 6A about 300 m southeast of the original site was surveyed. The 1996 Station 9 was at the head of Middle Loch, on the surface of the floating drydock *Machinist*, which was moved to Guam in 1999. Therefore, collections and obsevations were made at Station 9A, about 60 m northeast of the original location. The pier where Station 10 was surveyed in 1996 was occupied at the time of sampling in 2008, so sampling was conducted on the nearest available pier at Station 10A, about 140 m northwest of the original location. Finally, although the location of Station 12 was the same in 2008 as in 1996, the habitat was greatly altered by the construction of the Ford Island Bridge, which was completed in 1997.

Sampling at each station in 2007-8 was conducted by S. L. Coles, who conducted the 1996 surveys with R. C. DeFelice, and by H. Bolick. Observations and collections were conducted in a similar manner as in 1996, although the quantities of material sampled were less than in 1996 and collections cannot be considered as comprehensive as in 1996. Sampling consisted of collecting fouling organisms growing on hard surfaces from the intertidal zone to the bottom,

which ranged in depth from 0.5 to 8 m. Collections were made by SLC from as large a variety of habitats as possible while using scuba. Both organisms and the substrata on which they were growing were collected, retained in a 500 nm mesh net, relaxed by adding magnesium sulfate on site and then returned to the laboratory where they were preserved in 70% ethanol until sorting and identification of organisms. Investigators also recorded on underwater paper the algae, invertebrates and fishes that were identifiable on site at each station and photographed organisms using digital cameras. Sponges collected were photographed in the laboratory and notes on color and texture recorded before they were preserved in 70% ethanol and sent to the sponge taxonomic expert.

In order to compare changes in biotic conditions in Pearl Harbor over the past decade with a similar harbor and estuarine area on O‘ahu, six stations were resurveyed in Honolulu Harbor and Ke‘ehi Lagoon that were previously surveyed in 1997 (Coles et al. 1999b). Three stations were selected from the 15 sites that were surveyed in Honolulu Harbor and three of the six sites that were surveyed in Ke‘ehi Lagoon. Station locations are shown in Figure 5 and site information summarized in Table 1. One of the Honolulu Harbor sites was on a reef area that exists between Piers 29 and 30, one was on Pier 40 near the Pier 41 drydock, and one was on the slope from the shore along Sand Island Park. The Ke‘ehi Lagoon sites were on the Ke‘ehi Marina floating docks, on a barge wreck along the west seaplane channel, and in the mangrove area at the outlet of Moanalua-Kalihi Streams. These six stations therefore duplicated the full variety of environments that were sampled in Pearl Harbor.

Specimens collected were sorted and identified to species or the lowest practicable taxa, using dissecting or compound microscope magnification where necessary. Identifications were made using descriptions available in Reef and Shore Fauna of Hawaii Sections 1 to 4 (published) and 5 to 6 (unpublished), various taxonomic references, and voucher specimens in the Bishop Museum collections. Specimens from various groups were sent to taxonomic experts for identification or verification of preliminary identifications (see Acknowledgments).

All organisms identified from the field study were entered on an Access database relational with databases for previous literature reports and museum collections of organisms from Pearl Harbor. The combined information was used to track the occurrence of species chronologically as they were reported in Pearl Harbor.

The Sorenson’s Index of Similarity, based on presence-absence of species at station pairs, was used to measure the degree of association between stations. By this index, the more species two stations share relative to their total species complements, the greater their ecological similarity. Based on a matrix of Sorensen Index values, cluster analysis was used to arrange stations into groups or clusters. Intercluster distances were calculated using an unweighted pair group average method. In this analysis, similar stations will form clusters distinct from other stations. These clusters are arranged in a hierarchical, treelike structure called a dendrograph. Calculation of the similarity measures and cluster analysis were performed using the Multi-Variate Statistical Package, ver. 2.1 (Kovach 1993).

Figure 4. Pearl Harbor 1996 and 2008 sampling stations.

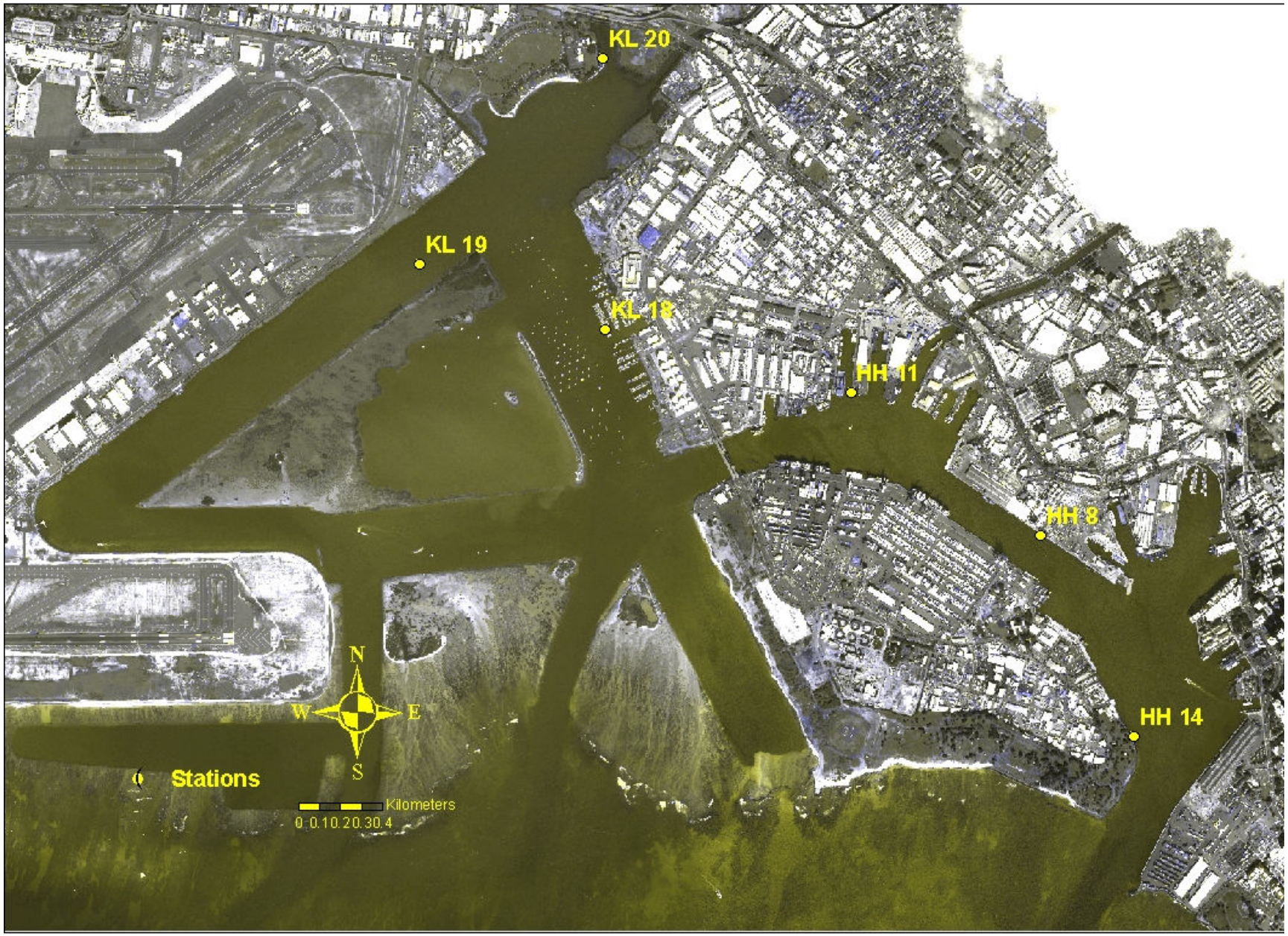


Figure 5. Honolulu Harbor and Ke‘ehi Lagoon stations sampled in 1997 and 2008.

Table 1. Station locations, depths, sampling dates and coordinates in decimal degrees and UTM Nad83 Zone 4N for sites surveyed in Pearl Harbor, Honolulu Harbor and Keʻehi Lagoon.

Area	Station	Location	Depth (m)	Date	Latitude	Longitude	NAD83 Northing	NAD83 Easting
Pearl Harbor	PH 1	Channel Entrance	0.5-4	12-FEB-08	21.32446834	-157.97030616	2358407.09314091	606786.13207475
	PH 2	West Loch Entrance	0.5-2	31-JAN-08	21.34393623	-157.97494872	2360558.85822251	606290.60229391
	PH 3	Walker Bay	0.5-1	04-APR-05	21.35849996	-157.99013992	2362160.73533542	604704.91427753
	PH 4	West Loch South	0.5-1	04-APR-05	21.36105551	-158.02044444	2362423.73733911	601560.87140570
	PH 4A	West Loch South	0.5-1	01-APR-08	21.35867824	-158.01335284	2362165.19434877	602297.83663466
	PH 5	West Loch North	0.5	04-APR-05	21.37448332	-158.01236663	2363915.29560966	602389.10860014
	PH 5A	West Loch North	0.5-1	01-APR-08	21.37065816	-158.00809102	2363494.68034371	602835.07033860
	PH 6	Hospital Point	0-5	30-OCT-07	21.34604244	-157.96705741	2360797.34553073	607107.41094805
	PH 6A	Hospital Point South	0-7	12-FEB-08	21.34372643	-157.96546041	2360542.07271489	607274.70466011
	PH 7	Waipiʻo Peninsula	0.5-2	30-OCT-07	21.35795848	-157.97353663	2362111.94199827	606426.91273898
	PH 8	Pan Am Landing	0.5-5	25-MAR-08	21.37488071	-157.97768625	2363982.27117574	605984.45548241
	PH 9	Machinist Hull	0-8	04-APR-05	21.38661663	-157.99066664	2365272.62784830	604630.31606684
	PH 9A	Machinist Hull Site	0-8	25-MAR-08	21.38632159	-157.99112840	2365239.66224813	604582.65479514
	PH 10A	Southeast Loch Dock	0-8	26-FEB-08	21.35597834	-157.95217166	2361907.36452160	608643.74003113
	PH 11	Southeast Loch Entrance	0-5	31-JAN-08	21.35901846	-157.94716070	2362247.34829986	609161.09070060
	PH 12	Northeast Ford Island	0-5	26-FEB-08	21.36898982	-157.94902434	2363349.79856134	608960.47139086
	PH 13	Utah Memorial	0-7	04-MAR-08	21.36895370	-157.96225886	2363336.68571914	607588.29007454
	PH 14	HECO Discharge	0-2	04-MAR-08	21.38696926	-157.96052875	2365332.03380055	607754.48536102
	PH 15	Rainbow Bay Marina	0-3	27-NOV-07	21.37201083	-157.93636339	2363693.02708832	610270.95072872
Honolulu Harbor	HH 8	Pier 29-30	1-10	17-APR-08	21.31100139	-157.87365058	2356984.99782062	616821.53177409
	HH 11	Pier 40-41	0.5-8	17-APR-08	21.31721179	-157.88226147	2357666.08445840	615923.47701809
	HH 14	Sand Island Park	1-9	17-APR-08	21.30232997	-157.86941570	2356028.27947246	617267.68588190
Keʻehi Lagoon	KL 18	Marina Docks	0-2	22-APR-08	21.31998260	-157.89349096	2357964.57174173	614756.57686395
	KL 19	Barge Wreck	0.5-5	22-APR-08	21.32284552	-157.90199968	2358275.30051185	613871.84472935
	KL 20	Stream Mouth	0-.5	22-APR-08	21.33164962	-157.89354385	2359255.98231006	614742.02017091

RESULTS

A. Station Site Descriptions

Pearl Harbor

PH 1. (Latitude 21°19.468'N, Longitude 157°58.218'W). *North side of entrance channel to Pearl Harbor, adjacent to a now unused discharge pipeline from the Iroquois Point sewage treatment plant*. This station is the most exposed to oceanic conditions, with many characteristics of a coral reef environment. A shallow shoreline bench about 0.5 m deep lies along a calcareous sand beach and rises from the adjacent channel of about 10 m depth. The primary substrata are consolidated calcareous submerged beach rock, reef with minimal coverage of live corals, and intermittent coral boulders and cobbles. The site is frequently exposed to short period waves generated by northeast trade winds and shows characteristics of a windward reef environment. It also is directly exposed to large storm waves from the south generated by local Kona storms. A variety of reef fish are present. Benthic fauna are dominated by sponges, tunicates, bryozoans and macroalgae, with a few reef corals. Biota characteristic of both harbor and reef environments occur at this site, reflecting its transition between the two environments.

PH 2. (Latitude 21°20.636'N, Longitude 157°58.497'W). *North side of West Loch entrance channel about 600 m SE of Keka'a Point, on the western shore of Waipi'o Peninsula*. The substratum is consolidated limestone, within medium to fine calcareous white sand areas on the shore and channel sides of the hard substrata. Bottom depths range from 6 m outside of the hard substratum to 1-3 m inshore. Many abandoned wooden pilings provide habitat for wood borers and fouling organisms. Since the site was first surveyed in 1996 a monoculture of the invasive introduced algae *Graciliaria salicornia*, which was not noted at this site in 1996, has developed and now covers virtually 100% of the bottom. This is one of the few sites within the harbor where reef corals occurred in 1996. A single colony of *Porites compressa* at about 2.5 m depth that was approximately 15 cm in diameter in 1996 (Coles 1999) has maintained its growth above the *Gracilaria* and was approximately 0.75 X 1.5 m in diameter in January 2008. Small *Leptastrea purpurea* colonies also occur in shallow areas, but *Pocillopora damicornis*, which were relatively abundant in 1996, were not found in 2007-8, probably having been overgrown by *Gracilaria*.

PH 3. (Latitude 21°21.802'N, Longitude 157°58.555'W). *Walker Bay.* In the 1996 study this site was surveyed in 0.5 m depth near the shoreline of Walker Bay, on the west shore of Waipi'o Peninsula, about half way up West Loch. The water was highly turbid and sediment laden and the substratum was fine-grained silt and mud sediment, with abundant mangroves along a calcareous shoreline bench. Macrofauna growing in and on sponges occurred only on mangrove roots and on debris in shallow water offshore, and the principal macrofauna was *Crassostrea virginica* oysters abundant on mangrove prop roots. Due to warnings of potentially health-hazardous conditions in Walker Bay from the Hawai'i Department of Health, this site was not resurveyed in the present study

PH 4A. (Latitude 21°21.521'N, Longitude 158°00.801'W). *West Loch South*. The 1996 location for this site was 100 m offshore of the mangroves near the western part of West Loch, near the Pearl Harbor National Wildlife Refuge. The substratum was the remains of a metal hull of boat wreck covered with a heavy

growth of oysters and sponges in 0.5-1.0 m. Because of extremely high water turbidity at the time of the present survey sampling for this site was moved ca. 775 m southeast of the 1996 location to an emergent fossil reef platform that provides a hard surface supporting abundant sponges, barnacles and the invasive introduced algae *Acanthophora spicifera* and *Gracilaria salicornia*.

PH 5A. (Latitude 21°22.240'N, Longitude 158°00.485'W). *West Loch North*. The 1996 PH 5 site was in a mangrove area at the head of West Loch near the mouth of Waikele stream, with a substratum of mostly deep, soft, mud-silt sediments and intermittent sponges. The water was highly turbid and sediment laden and depth was 0.5 m. Large *Crassostrea virginica* oysters were very abundant on mangrove prop roots, and numerous shells of apparently recently dead Japanese little-neck clam *Venerupis (Ruditapes) phillippinarum* were found in the sediments. Water depth was at the time of the 2008 survey too shallow to reach this site by boat, and the mud was too soft and deep to be able to reach it on foot. Consequently, the location of sampling for this site was moved ca. 615 m southeast of the original location, where only a very few macroinvertebrates and one alga, *Acanthophora spicifera* occurred on or under mangrove prop roots at ca. 1 m depth on a mud bottom.

PH 6A. (Latitude 21°20.624'N, Longitude 157°57.927'W). *Hospital Point South.* Due to security restrictions that prevented re-sampling at the 1996 Drydock Number 4 site, sampling and observations were made approximately 200 m southeast from the original location. The substrata for both locations are concrete pilings and a calcareous bench and slope ranging from 1 m depth to a flat fine sand bottom at 6 m. Macrofauna at 6A was a dense coverage of a suspension feeding fouling community on the pier pilings, especially chaetopterid polychaete worms and sponges, bryozoans and tunicates, and the introduced octocoral *Carijoa* aff. *riissei*.

PH 7. (Latitude 21°21.477'N, Longitude 157°58.412'W). *Waipio Peninsula along the Middle Loch Channel across from Ford Island*. This shallow bench is approximately 10 m wide, and at the edge of the bench depth increases to 2-3 m to a flat, coarse sand bottom with abundant coral rubble. The shallower area is densely covered with *Gracilaria salicornia,* which forms a habitat for numerous native and introduced macroinvertebrates. Density and thallus length of the *Gracilaria* have increased noticeably since 1996 survey, creating a near monoculture on the bottom. However, the coral *Leptastrea purpurea*, which did occur here in 1996 has also increased in abundance, with numerous colonies up to 5 cm in diameter occurring where hard substratum is still available.

PH 8. (Latitude 21°22.493'N, Longitude 157°58.661'W). *West side of Waiawa Peninsula at the former Pan American Clipper Landing Dock*. The substrata sampled was concrete and wood pilings offshore of the dock down to 5 m depth. This site had the greatest number of reef fishes noted at any site within the harbor, including abundant large *Acanthurus blochi and Kuhlia sandvicensis*. The introduced algae *Gracilaria salicornia* was noted to be very abundant in shallow water along the shoreline.

PH 9A. (Latitude 21°23.179'N, Longitude 157°59.468'W). *Head of Middle Loch in the vicinity of the former location of the floating dry-dock USS Machinist*. The dry-dock was brought to Pearl Harbor from the Philippines in 1992 and transferred to Guam in 1999. In 1996 samples were taken from the steel hull of the *Machinist* itself, from the shallow subtidal to the bottom of the hull at 8 m depth, and from nearby

wooden pilings from the intertidal to 4 m depth. Because the *USS Machinist* was moved from Pearl Harbor in 1999, 2008 samples and observations were taken within 100 m of its former location from the nearest stationary hard surface, which was a marker buoy with concrete pilings and adjacent wooden pilings that were highly eroded from shipworm feeding.

PH 10A. (Latitude 21°21.359'N, Longitude 157°57.131'W). *Southeast Loch Dock*. Because of ship activity at the 1996 site adjacent to Pearl Harbor Navy Shipyard in Southeast Loch, the site was moved to a docking basin just west of the 1996 Dock B-2 1 site. Both sites are in the vicinity of Navy and industrial operations, where considerable ship traffic, hull cleaning and ship maintenance occurs. Despite this high industrial use of the area, a very abundant fouling fauna was noted on all hard surfaces present. Sampling was conducted from and observations made among the wooden and concrete dock pilings from the shallow subtidal down to 6 m.

PH 11. (Latitude 21°21.541'N, Longitude 157°57.830'W). *Southeast Loch Entrance*. Observations were made along the pier pilings on the east side of the South Channel, near north side of the entrance to Southeast Loch. Samples were taken from 0.5 to 5 m depth. Although a few *Pocillopora damicornis* and *Leptastrea purpurea* reef corals were found at this site in 1996, none were found in January 2007 on any of the hard surfaces sampled, which were dominated by abundant fouling organisms, many of them introduced.

PH 12. (Latitude 21°22.139'N, Longitude 157°56.941'W*). Northeast Ford Island* The original site was northeast of Ford Island and the *USS Arizona* Memorial and just northwest of Mokunui Island, near the present Ford Island bridge terminus. In 1996 the substratum at this site was clay compacted to the consistency of soft rock but still capable of being broken apart by hand, and outcroppings of calcareous beach rock and reef. The concrete buttresses of the Ford Island Bridge now provide ample hard substratum for abundant fouling, especially for a variety of sponges, and the bottom in 2008 was covered with abundant *Gracilaria salicornia* invasive algae.

PH 13. (Latitude 21°22.137'N, Longitude 157°57.736'W). *Utah Memorial*. On the northwest side of Ford Island, on concrete dock pilings and on the surface of the *USS Utah* at the memorial along the north channel into East Loch. A highly diverse invertebrate fauna was noted, including abundant specimens of *Pocillopora damicornis* corals, the jewel box bivalve *Chama* sp. and the hoof shell *Hipponix imbricatus*.

PH 14. (Latitude 21°23.218'N, Longitude 157°57.632'W). *HECO Discharge.* Along the sheet piling separating the intake and discharge zones for cooling water from the Hawaiian Electric Waiau Generating Station at the head of East Loch. Samples were taken from the discharge side from the sheet piling from the intertidal to the base of the piling at 2 m, from about 100 m beyond the thermal effluent discharge point to the outfall, where the temperature is approximately 5°C above ambient. Sponges dominate the benthos, especially in the vicinity of the outfall, where the substratum is largely a massive sponge "reef" that covers the entire bottom along the sheet piling side of the discharge. Other organisms abundant along the sheet piling are dense populations of the anemone *Aiptastia puchella*, hydroids and bryozoans.

PH 15. (Latitude 21°22.321'N, Longitude 157°56.182'W). *Rainbow Bay Marina, at the northeast head of East Loch*. Sampling was done from the surfaces of floating buoys and dock floats of the Marina's piers and docks, which are dominated by a dense cover of a variety of sponges. Offshore the substratum is a shallow, gently sloping intertidal to subtidal zone composed of calcareous rock and rubble with a thin sediment cover, and soft sediments dominating further offshore. Both substrata were dominated in 1996 by a moderately heavy growth of fine filamentous green algae (cf. *Chloradesmis sp.*) and intermittent patches of high coverage of the branching leafy green macroalga *Caulerpa sertularoides,* but in 2008 the dominant benthic cover is patchy to dense mats of the invasive algae *Gracilaria salicornia*.

Honolulu Harbor-Ke'ehi Lagoon

HH 8. (Latitude 21° 18.660'N, Longitude 157° 52.419'W*). Pier 29-30.* This site lies between Piers 29 and 30 along the Kapālama Channel, and it represents a relatively natural environment compared to other areas in Honolulu Harbor. Although the structure of area was formed from dredging a channel through a former reef flat, it has the appearance of reef slope outside of a narrow fringing reef that extends about 5 m from the shoreline. This 1-2 m deep flat area is rubble strewn and quite barren, but the slope outside the reef has a variety of coral species with moderate coverage and numerous fishes, which are probably attracted to the rugose habitat provided by the numerous small holes and ledges on the slope. The reef slopes to nearly 10 m (depth where the bottom levels off to a fine silt substratum. Observations and sampling were also done just northwest of this site along Pier 30, where the concrete pilings of the pier and the reef substratum below have heavy fouling and abundant sponges with a heavy silt coating.

HH 11. (Latitude 21° 19.033'N, Longitude 157° 52.936'W). *Pier 40-41.* Sampling for this station was done in 1997 from the surface of the main dry-dock operating in Honolulu Harbor, located at the end of Pier 41. Sampling for the present study was made across the basin from Pier 41, on the concrete surfaces along the side and front of Pier 40, which provides a habitat for numerous corals, sponges and large tunicates.

HH 14. (Latitude 21° 18.140'N, Longitude 157° 52.165'W). *Sand Island Park*. Located at the border of Anuenue Fisheries Center and Sand Island Park, near the beginning of the harbor entrance channel. The substratum is a steep slope dredged from the reef and small boulders 1-2 m in diameter extending down to the fine sediment harbor bottom at 9 m depth. Corals and associated invertebrates were moderately abundant and a variety of fish species were present.

KL 18. (Latitude 21° 19.183'N, Longitude 157° 53.663"W). *Marina Docks*. Keehi Lagoon Marina floating docks located midway between Honolulu Harbor's Kalihi Channel and the mouths of Kalihi and Moanalua Streams. The dock surfaces are very heavily fouled and are anchored in 3 m of turbid water over a muddy sediment bottom.

KL 19. (Latitude 21° 19.087'N, Longitude 157° 54.446'W). *Barge Wreck*. Located midway along the reef side of the Lagoon Drive seaplane runway, the site is an iron barge hull stranded on the reef edge. Depth on the runway side of the barge was 4.5 m (and decreased to 1 m on the reef side of the barge. The hull had only moderate fouling in 1997 with a heavy sediment coating, and the bottom substratum was fine sand to silt. In 2008 the barge surface was heavily fouled, especially with sponges and tunicates

KL 20. (Latitude 21° 19.910'N, Longitude 157° 53.586'W). *Stream Mouth.* The site was at the mouth of Moanalua Stream where abundant red mangrove (*Rhizophora mangle*) roots provide the only solid substratum in the muddy bottom. Samples were taken from the roots at 0-0.5 depth.

B. Biota Observations and Collections

This study identified a total of 298 taxa observed or collected from the 14 stations sampled in Pearl Harbor and 195 taxa from the six stations in Honolulu Harbor and Ke'ehi Lagoon. These are listed and compared with previous reports from those locations in Appendix A and listed by station in Appendices B and C. The result of the Sorenson's similarity analysis for the results from all locations are shown in Figure 6 with the total numbers of taxa identified from each station, and the numbers of taxa found at each station are summarized on the maps in Figure 7.

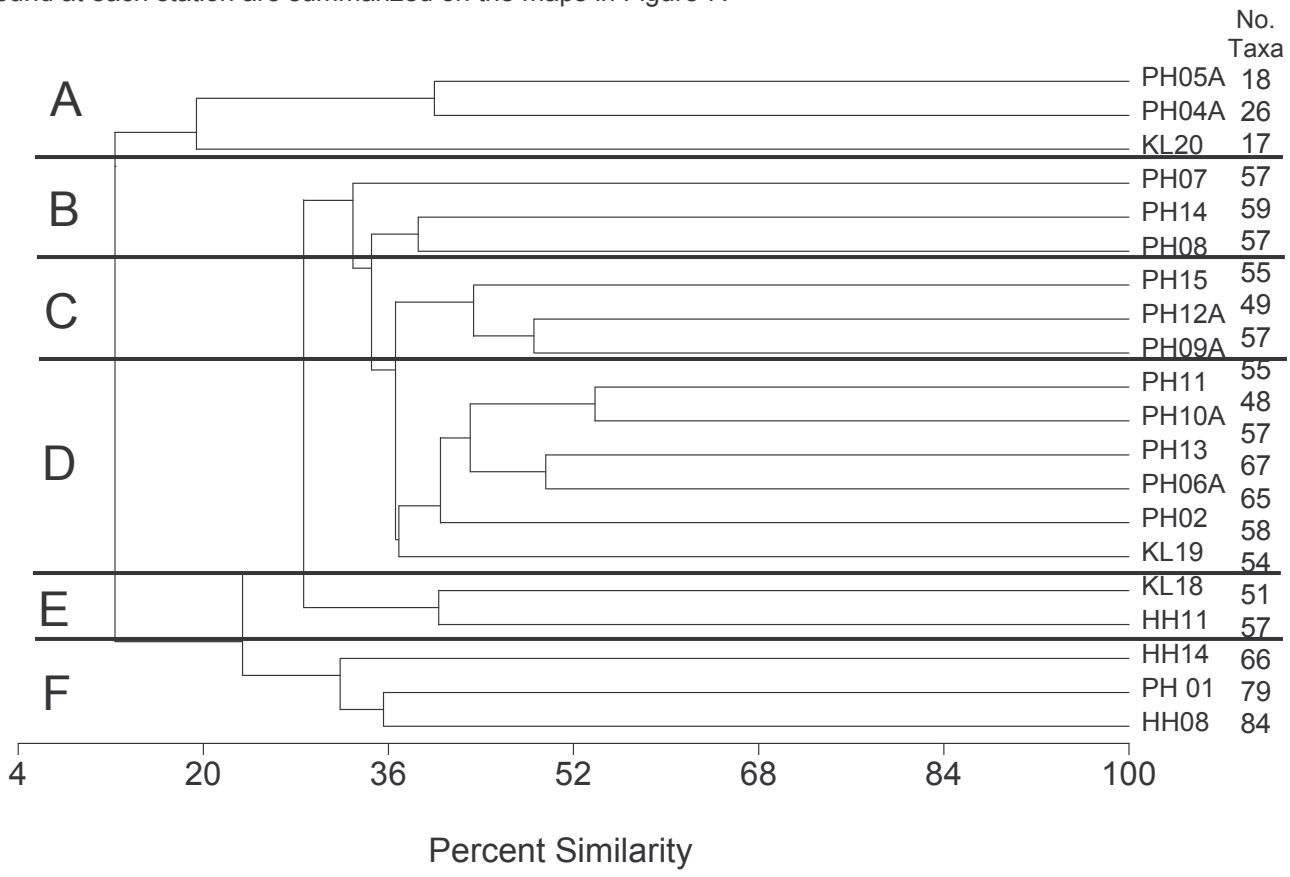


Figure 6. Dendrograph of Sorensen similarities and numbers of taxa for all sites sampled in Pearl Harbor, Honolulu Harbor and Ke'ehi Lagoon.

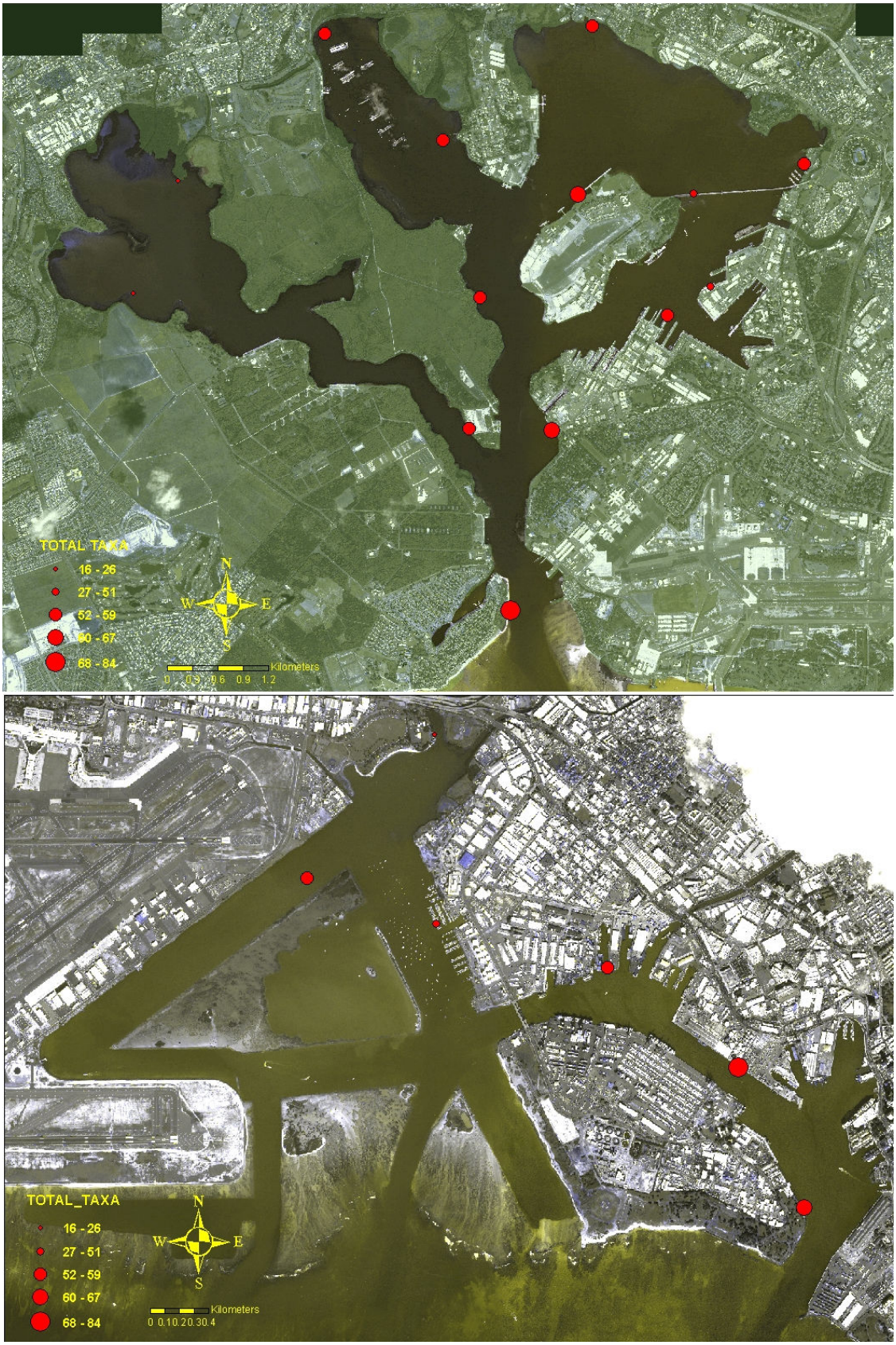


Figure 7. Distributions of numbers of taxa identified at Pearl and Honolulu Harbors and Keʻehi Lagoon.

Both figures indicate that the distributions of the numbers of taxa are determined by proximity of the site to harbor mouths and oceanic conditions, and that number of taxa decrease as conditions become more isolated and water circulation becomes more stagnant. Six station clusters are indicated in the dendrograph in Figure 6 that are associated with numbers of taxa and the position of the sites within the harbors or Keʻehi Lagoon. Cluster A consists of the three stations with the lowest taxa numbers that were in highly turbid mangrove areas in West Loch, Pearl Harbor or at the mouth of Moanalua Stream in Keʻehi Lagoon. By contrast, Cluster F consists of the three stations with the highest numbers of taxa closest to harbor entrances at Pearl Harbor and Honolulu. All three of these sites showed characteristics of reef environments, with many reef corals and reef fishes that did not occur at most interior sites more remote from the open ocean, and the environment at these three stations can be considered transitional from ocean reefs to more typical harbor conditions. Clusters B and C consist of three stations each, with intermediate numbers of taxa, and Cluster B including sites from Waipio and Waiawa Peninsulas and the Waiʻau Power Station outfall at the head of East Loch. Cluster C included two other East Loch stations at Rainbow Bay Marina and the Ford Island Bridge and one station at the head of Middle Loch. Cluster D is the largest and is composed of the remaining stations in Pearl Harbor, from the tip of Waipiʻo Penisula, Navy pier areas along the entrance to East Loch, and the *USS Utah* memorial on the northwest side of Ford Island. This cluster also included the station at the wrecked barge in Keʻehi Lagoon, and may be considered the most representative of fouling communities associated with piers and hard surfaces in the harbors. Cluster E included stations near the Honolulu Harbor drydock and at the Keʻehi Lagoon Marine, with similar substrata and environments as Cluster D, but most sites with slightly fewer taxa than in Cluster D.

Although Pearl Harbor was thoroughly sampled in two major studies in the 1971-72 and again in 1996 at many or all of the present sites, and collections in the harbor date back to the beginning of the 20th century, a substantial number of newly reported genera or species were identified from the present study. Likewise, the six sites in Honolulu Harbor and Keʻehi Lagoon produced many new reports that were not recorded from 20 harbor or lagoon sites in the previous comprehensive sampling in 1997 or from previous studies. These newly reported genera are summarized for each station and all sites combined in Figure 8. Overall, 75, or about 25% of the 298 taxa identified by the present study for Pearl Harbor were new reports for genera or species, and 41 or about 20% of the 195 total were new for Honolulu Harbor-Keʻehi Lagoon. The most new reports, by number or percent of total were near the entrances for both harbors, i.e. 24 (30.4%) at Station 1 in Pearl Harbor, and 18 (21.2%) at Honolulu Harbor Station 8, corresponding to sites of highest species numbers and transitional coral reef environments. In Pearl Harbor, the second and third lowest (2, 11.1% and 3, 11.5%) new reports occurred at the West Loch sites that had the fewest total taxa, and in Honolulu Harbor-Keʻehi lagoon this occurred at KL20 (1, 5.3%), the site of fewest total taxa for the entire study.

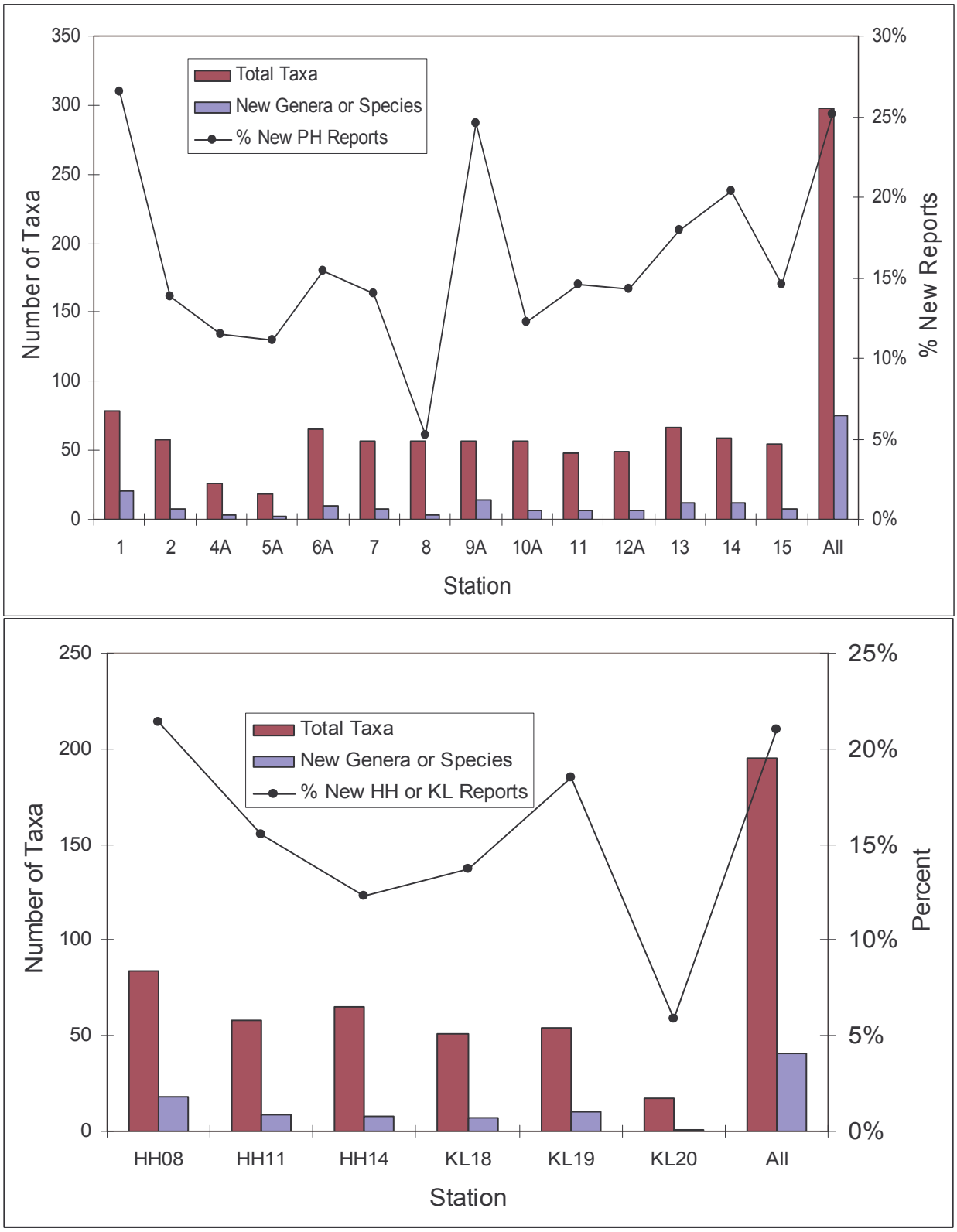


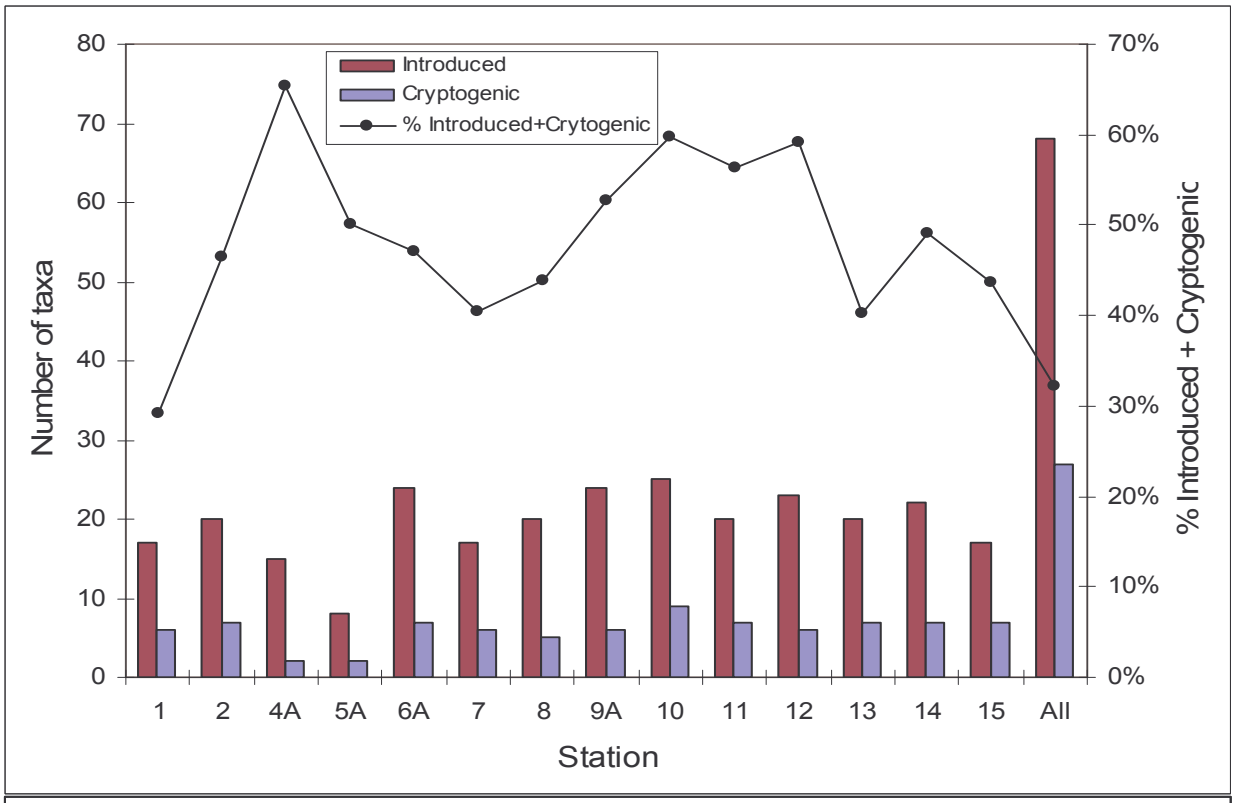
Figure 8. Total taxa and numbers of new genera or species found in Pearl and Honolulu Harbors and Ke‘ehi Lagoon.

A substantial portion of the total taxa identified in the study are considered introduced or cryptogenic (i.e. of uncertain origin but with some introduced characteristics) for Hawai‘i per the checklist developed by Carlton and Eldredge (2009). Previously unreported genera or species of sponges, hydroids, polychaetes and ascidians not designated by Carlton and Eldredge were also tentatively assigned cryptogenic status after consultation with taxonomic experts for those respective groups. Overall, 95 (32%) of the 298 taxa identified for all sites in Pearl Harbor are designated introduced or cryptogenic genera or species, and 68 (35%) of the 195 taxa from the six sites in Honolulu Harbor and Ke‘ehi Lagoon. Figure 9 shows the distributions of introduced and cryptogenic species and their proportion of total reports for all the stations. Percent introduced or cryptogenic species ranged 29 to 65% of total taxa for individual stations in Pearl Harbor and from 18 to 59% for stations in Honolulu Harbor-Ke‘ehi Lagoon. These values for individual stations were greater than overall means because many introduced and cryptogenic species were more widely distributed throughout the harbors than many of the native species. This is reflected by the low percent values near harbor entrances at Station 1 in Pearl Harbor and Station 14 in Honolulu Harbor, compared to the high values in the mangrove areas at Stations 4A and 5A, and in the vicinity of the Navy shipyard at Stations 10A, 11 and 12. Similarly, the highest percent component of total taxa that were introduced or cryptogenic in Honolulu Harbor-Ke‘ehi Lagoon occurred at in the mangrove area at Ke‘ehi Station 20, and at Ke‘ehi Stations 18 and 19, relatively isolated from oceanic circulation and having fewer total taxa than at Honolulu Harbor stations.

The previous survey of 15 stations in Pearl Harbor in 1996 (Coles et al. 1997) identified 96 genera or species considered to be introduced or cryptogenic, and a similar study in 1997 identified 90 at 20 stations in Honolulu Harbor-Ke‘ehi Lagoon (Coles et al 1999b). In Pearl Harbor 37 introduced or crypto genic genera or species were not previously found in the 1996 survey, 33 were not previously found in Honolulu Harbor-Ke‘ehi Lagoon. Of those 17 genera or species, mostly sponges, were new reports for Hawai‘i, with eleven found in Pearl Harbor and eleven in Honolulu Harbor-Ke‘ehi Lagoon (Table 2).

Of the 95 introduced or cryptogenic genera or species found in Pearl Harbor and the 68 in Honolulu Harbor-Ke‘ehi Lagoon, seven are considered invasive, i.e. potentially alter the character of the environment in the introduction location and/or threaten the survival or proprogation of native species through uncontrolled competition. The two most problematic of these are the red algae *Acanthophora spicifera* (Figure 10a) and *Gracilaria salicornia* (Figure 10b), and these were a focus of the present study that is described in the following Section C. The other invasive species are the Red Mangrove *Rhizophora mangle* (Figure 10c), the Orange Keyhole Sponge *Mycale grandis* (Figure 10d), the Snowflake Coral *Carijoa* aff. *riseii* (Figure 10e), the Caribbean Barnacle *Chthamalus proteus* (Figure 10f), and the Asian Stomatopod *Gonodactylaceus falcatus*.

The distribution of these species among the stations in both harbor areas is shown in Figure 11. *Rhizophora mangle* occurred at ten sites and was the dominant habitat former at all interior locations where the shorelines have not been hardened by construction of piers or seawalls. It also co-occurred



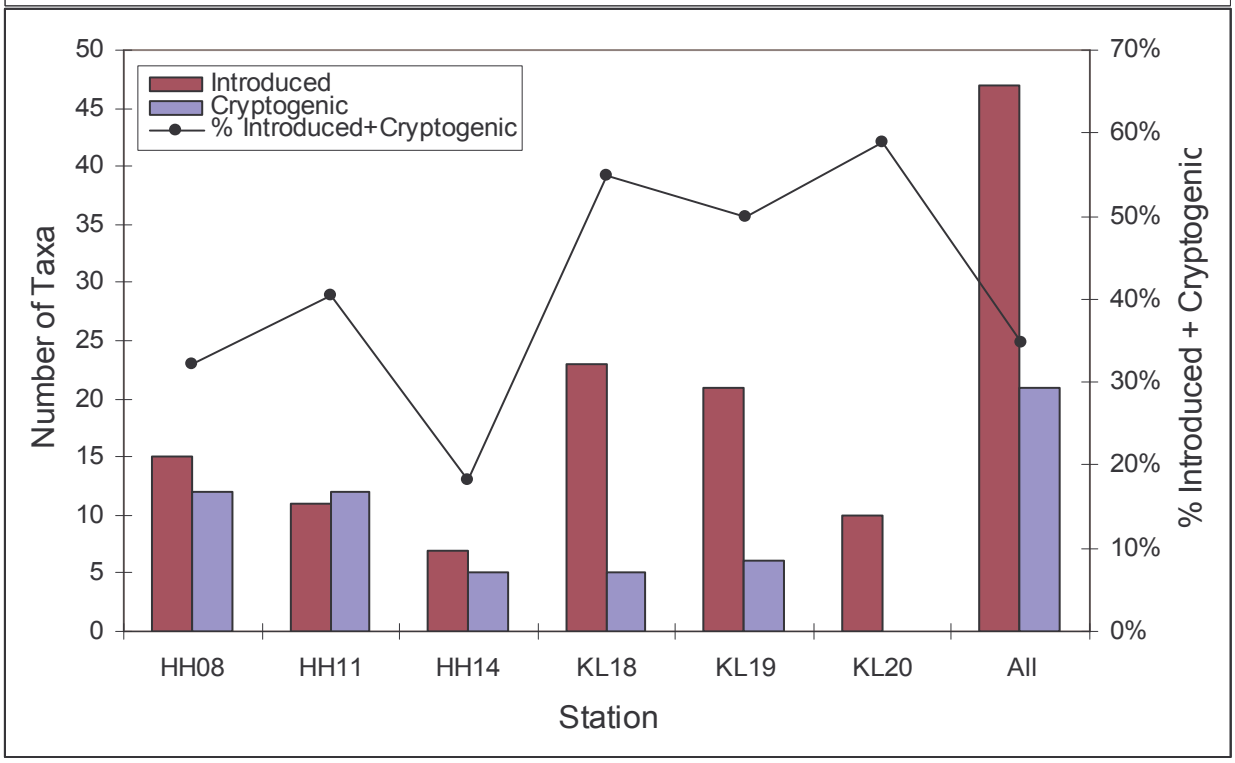


Figure 9. Numbers of introduced or cryptogenic genera or species and percent of total taxa observed or collected in Pearl and Honolulu Harbors and Ke‘ehi Lagoon.

Table 2. New genera and species reports for Hawai‘i identified from Pearl Harbor, Honolulu Harbor and Ke‘ehi Lagoon.

Pearl Harbor																	
Phylum	Scientific name	Author_Date	Origin	1	2	4A	5A	6A	7	8	9A	10A	11	12A	13	14	15
PORIFERA	*Iotrochota purpurea*	(Bowerbank, 1875)	Cryptogenic	x													
PORIFERA	*Topsentia halichondrioides*	(Dendy, 1905)	Cryptogenic	x				x	x				x				
CHORDATA	*Lissodendoryx (Lissodendoryx) similis*	Thiele, 1899														x	
PORIFERA	*Monanchora clathrata*	Carter, 1883	Cryptogenic	x				x							x		
PORIFERA	*Mycale phyllophila*	Hentschel, 1911	Cryptogenic		x												
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Hooper, 1991	Cryptogenic									x	x				
CNIDARIA	*Corydendrium parasiticum*	(Linnaeus, 1767)	Cryptogenic									x	x				
CNIDARIA	*Clytia* cf. *gracilis*	(M. Sars, 1850)	Cryptogenic		x			x									x
ANNELIDA	*Amphiglena mediterranea*	(Leydig, 1851)	Cryptogenic								x						
MOLLUSCA	*Lioconcha fasigata*	Sowerby, 1851	Cryptogenic												x		
CHORDATA	*Diplosoma* cf. *spongiforme*	(Giard, 1872)	Cryptogenic								x	x					
CHORDATA	*Polycarpa cryptocarpa*	(Sluiter, 1885)	Cryptogenic										x			x	
Honolulu Harbor-Ke‘ehi Lagoon																	
Phylum	Scientific name	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19									
PORIFERA	*Monanchora dianchora*	de Laubenfels, 1935	Cryptogenic	x	x			x									
PORIFERA	*Iotrochota baculifera*	Ridley, 1884	Cryptogenic		x												
PORIFERA	*Iotrochota purpurea*	(Bowerbank, 1875)	Cryptogenic	x	x												
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Hooper, 1991	Cryptogenic	x	x												
PORIFERA	*Scopalina sp.*		Cryptogenic	x													
CNIDARIA	*Clytia* cf. *gracilis*	(M. Sars, 1850)	Cryptogenic				x										
CNIDARIA	*Halopteris plagiocampa*	(Pictet, 1893)	Cryptogenic	x		x											
ANNELIDA	*Oenone fulgida*	Savigny, 1818	Cryptogenic					x									
MOLLUSCA	*Zafra* cf. *hervieri*	(Pace, 1903),	Cryptogenic			x											
CHORDATA	*Diplosoma* cf. *spongiforme*	(Giard, 1872)	Cryptogenic					x									
CHORDATA	*Polycarpa cryptocarpa*	(Sluiter, 1885)	Cryptogenic	x	x												

with many of the other invasive species, such as *Mycale grandis,* which was present to common at ten stations throughout Pearl Harbor and two in Honolulu Habor-Ke'ehi Lagoon. *CHtahmalus proteus* occurred on hard surfaces in the intertidal zone at 11 sites in Pearl Harbor and two in Ke'ehi Lagoon. *Carijoa* aff. *riisei* occurred at four sites in Pearl Harbor, at the entrance and along the main channel to the Ford Island Bridge in East Loch. *Gonodactylaceus falcatus* was found at only one site along the east side of Waipi'o Peninsula in Pearl Harbor, but it is undoubtedly more common, based on its cryptic nature and numerous reports from previous studies in the harbors

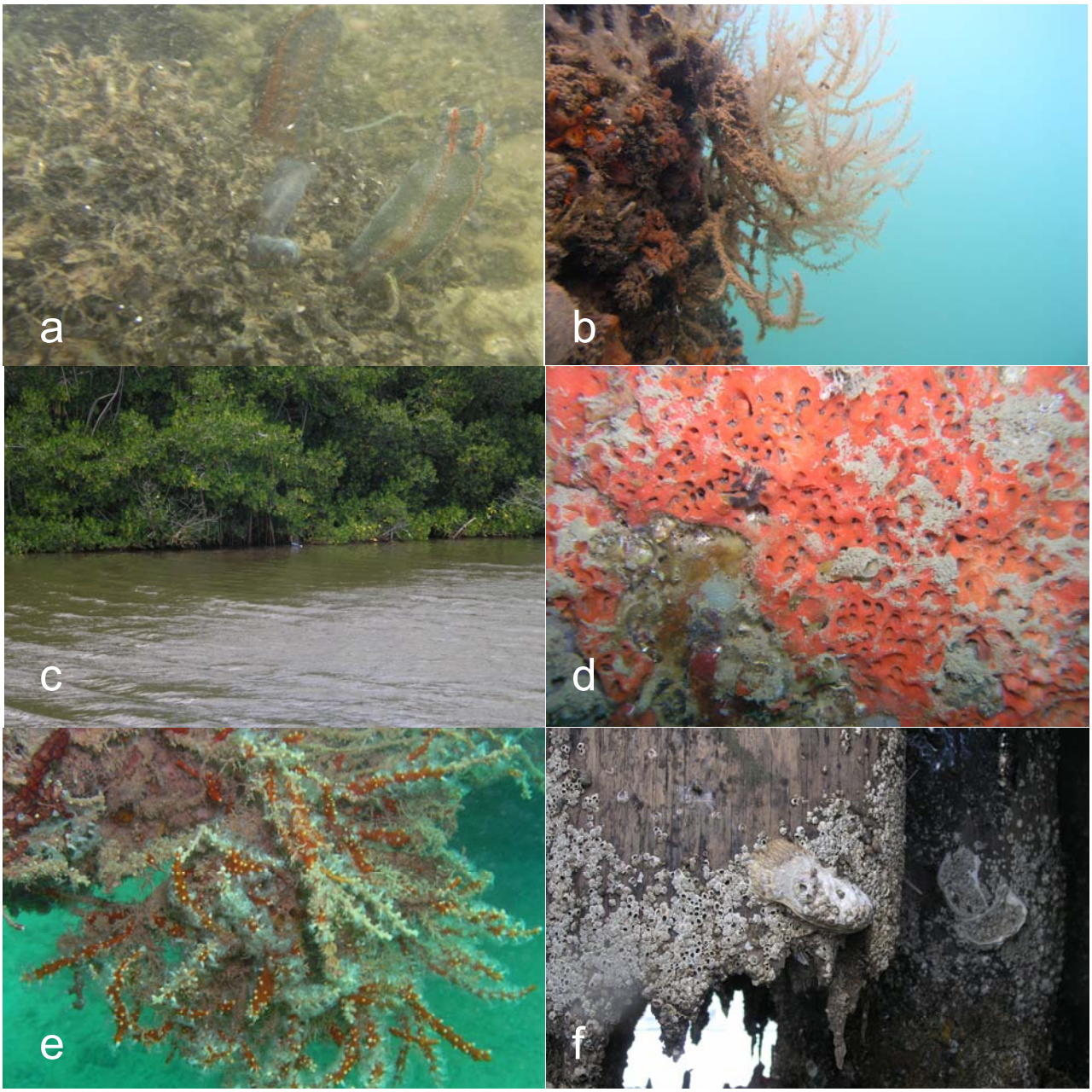


Figure 10. Invasive species in Pearl Harbor. **a**: Dense mat of *Gracilaria salicornia* with sea cucumber *Opheodesoma spectabilis* at PH Sta. 12; **b**: *Acanthophora spicifera* at PH Sta. 9A; **c**: *Rhizophora mangle* at PH Sta. 5A; **d**: *Mycale grandis* at PH Sta. 11; *e: Carijoa* cf. *riisei* at PH Sta. 1; **f**: *Chthamalus proteus* with *Crassostrea* sp. at PH Sta. 8.

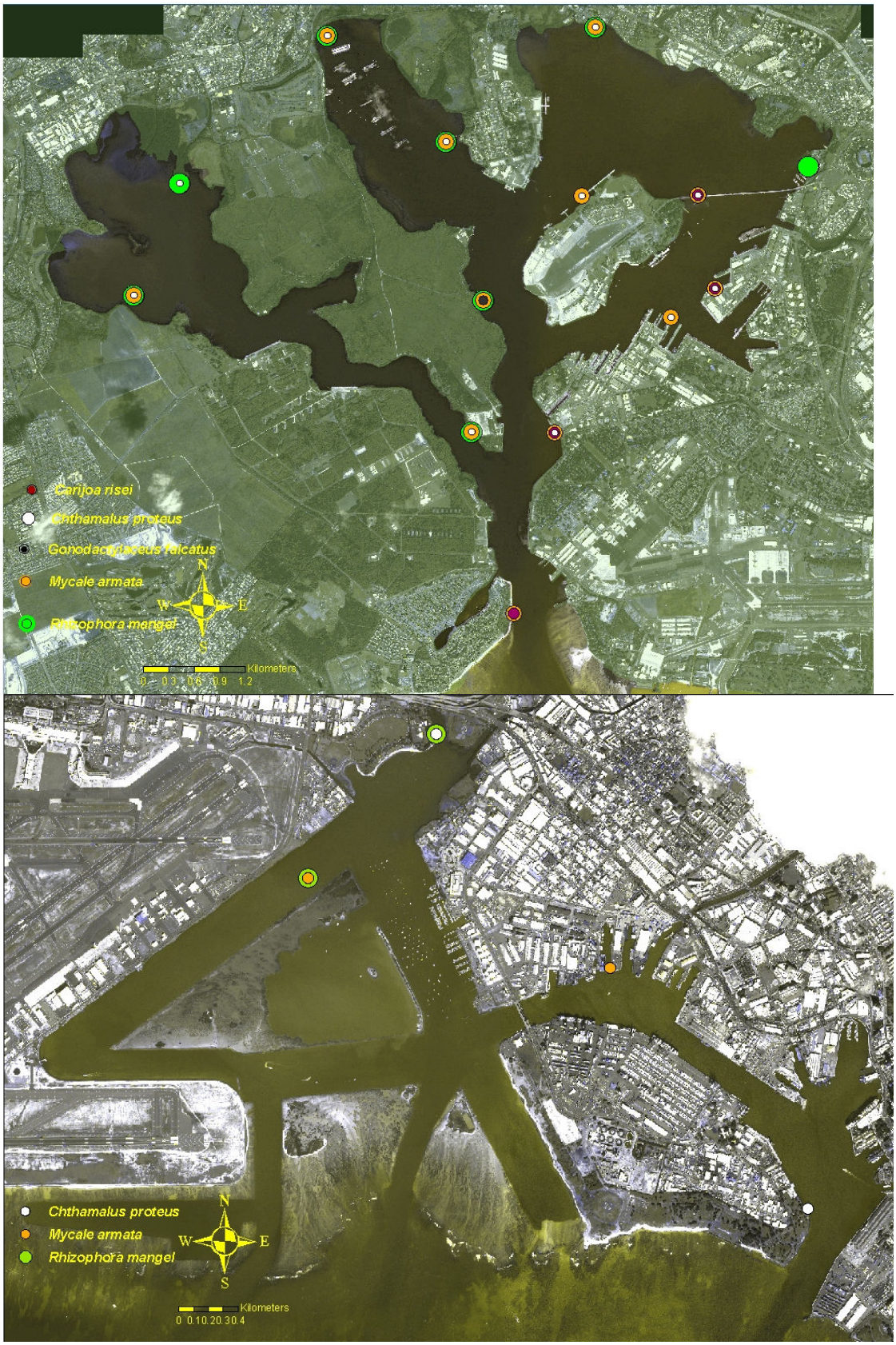


Figure 11. Locations of invasive introduced species in Pearl Harbor, Honolulu Harbor and Ke‘ehi Lagoon.

C. Introduced Invasive Algae

Table 3 compares the stations where the introduced invasive algae *Gracilaria salicornia* and *Acanthophora spicifera* occurred at Pearl Harbor collection sites in 1996 and 2007-8, and Table 4 for collection sites in Honolulu Harbor and Keʻehi Lagoon in 1997 and 2008. The "A" station designations in Table 3 indicate sites where, for various reasons, the collection site in 2007-8 did not exactly correspond to 1996, but was located nearby (Figure 4). The results indicate that both *Gracilaria* and *Acanthophora* were substantially more widespread in Pearl Harbor and Keʻehi Lagoon in 2007-8 than ten years earlier. *G. salicornia* was recorded 1996 only at Station 7 along Waipiʻo Peninsula, Station 8 at the Pan Am Landing and Station 15 at the Rainbow Bay Marina dock. In 2007-8 *Gracilaria* was also found at Station 1 near the harbor entrance, Stations 2 and 4A in West Loch, 9A at the head of Middle Loch, and 12A northeast of Ford Island. Although it was not recorded at the Rainbow Bay Marina dock station, it was abundant on the bottom nearby.

Acanthophora spicifera was not recorded anywhere on the 1996 Pearl Harbor collection surveys, but did occur in 2007-8 at Stations 4A and 5A in West Loch, Station 7 along Waipiʻo Peninsula, Station 13 at the Utah Memorial northwest of Ford Island and Station 14 along the HECO discharge sheet piling.

Table 3. Introduced algae observed at Pearl Harbor collection sites in 1996 and 2007-2008.

	1		2		4A		5A		7		8		9A		12A		13		14		15	
Algal Species	96	08	96	08	96	08	96	08	96	07	96	08	96	08	96	08	96	08	96	08	96	07
Gracilaria salicornia		x		x		x			x	x	x	x				x					x	x
Acanthophora spicifera						x		x		x								x		x		

Gracilaria salicornia was not found at any of the 22 Honolulu Harbor or Keʻehi Lagoon collection sites in 1997 but was abundant at Station 19 in Keʻehi Lagoon in 2008. *Acanthophora spicifera* occurred at Station 14 by Sand Island Park in both 1997 and 2008.

Table 4. Introduced algae observed at Honolulu Harbor and Keʻehi Lagoon collection sites in 1997and 2008.

	KL14		KL19	
Algal Species	1997	2008	1997	2008
Gracilaria salicornia				x
Acanthophora spicifera	x	x		

In order to obtain a more comprehensive view of distributions of these invasive algae, a series of snorkeling surveys were made in 2007-8 along the shorelines of Pearl Harbor and on shallow areas of Keʻehi Lagoon. For these, trained observers made observations of algae relative abundance approximately every 50 m while swimming along the shoreline or being towed slowly while using a manta board. A Garmin 76 GPS was used to mark the locations of algal abundance observation, and these coordinates were later downloaded and mapped using ArcMap 9.1 software. The relative abundances of *Gracilaria salicornia* and *Acanthophora spicifera* were recorded corresponding to the following criteria:

- Category O: not present
- Category 1: present in low abundance, patchy
- Category 2: abundant and forming mats
- Category 3: dense cover, thick 3 dimensional mats may resemble ”tumbleweeds”

Figure 12 shows the results of these observations in Pearl Harbor for *Gracilaria salicornia* and Figure 13 for *Acanthophora spicifera*. Figure 14 summarizes the total number of observations for each of the four categories for both species. The data include all locations in Pearl Harbor where the shoreline could be accessed and observations could be made. This excluded militarily secure areas, areas where the shoreline has been altered to vertical concrete walls or piers, areas where bottom depths exceed the zone of algal growth, areas where the shoreline is mostly stands of the red mangrove *Rhizophora mangle*, areas where high water turbidity prevents sufficient light on the bottom to support algal growth, or areas where shallow depths prevented approaching the shoreline from offshore. Therefore it was not feasible to make observations at the heads of West Middle and East Lochs, along much of the main channel, or anywhere on the east side of the harbor from Hospital Point to Rainbow Bay Marina, including the entire shipyard area in Southeast Loch.

For those areas that were accessible, a total of 1215 observations were made in Pearl Harbor, with 876 or 72% of the locations showing *Gracilaria salicornia* to be present in categories 1 to 3. Figure 14 shows the frequencies in each category for both *Gracilaria* and *Acanthophora*. For *Gracilaria*, the most observations (34%) were in the maximum abundance Category 3, well exceeding the number of observations with no algae (8.3%), and followed by 23.6% for Category 2 and 14.4% in Category 1. Figure 14 shows that category distributions were patchy, with areas of highest abundance often separated by areas of no occurrence along much of West Loch, the Waipi‘o and Waiawa Peninsulas and the west shore of Ford island. Virtually all sections of the harbor where observations could be taken had substantial cover of *Gracilaria* except along the north and east shores of East Loch and along the east side of the main channel entrance where wave turbulence probably inhibits *Gracilaria* recruitment and growth.

The distributions and summary of category values for *Acanthophora spicifera* (Figures 13 and 14) indicates that it is much less wide spread and abundant than *Gracilaria* in Pearl Harbor. Of the 1215 observations, 972 (80%) had no *Acanthophora*, and 149 (12.3%) were in Category 2, followed by 78 (6.4%) in Category 2 and only 16 (1.3%) in Category 3. Although the two algae often co-occurred, *Acanthophora* was frequently found in areas where high water turbidity and muddy sediments excluded *Gracilaria*, such as an in the most inner reaches of West and Middle Lochs. For example, at collection Station 5A turbidity was so high that visibility was less than 0.25 m, but *A. spicifera* was among the few organisms growing among mangrove roots at ca. 1.5 m depth, indicating the tolerance to light low and the durability of this hardy introduced species. Since comprehensive surveys for introduced algae were not done in 1996, it is not possible to definitively know how much the extensive coverage of *Gracilaria salicornia* and *Acanthophora spicifera* found on the recent surveys occurred at that time. However, it is highly probable that coverage and abundance of these two invasive species has increased greatly in the last decade. Of the 15 stations where observations and collections were made in 1996, only two had

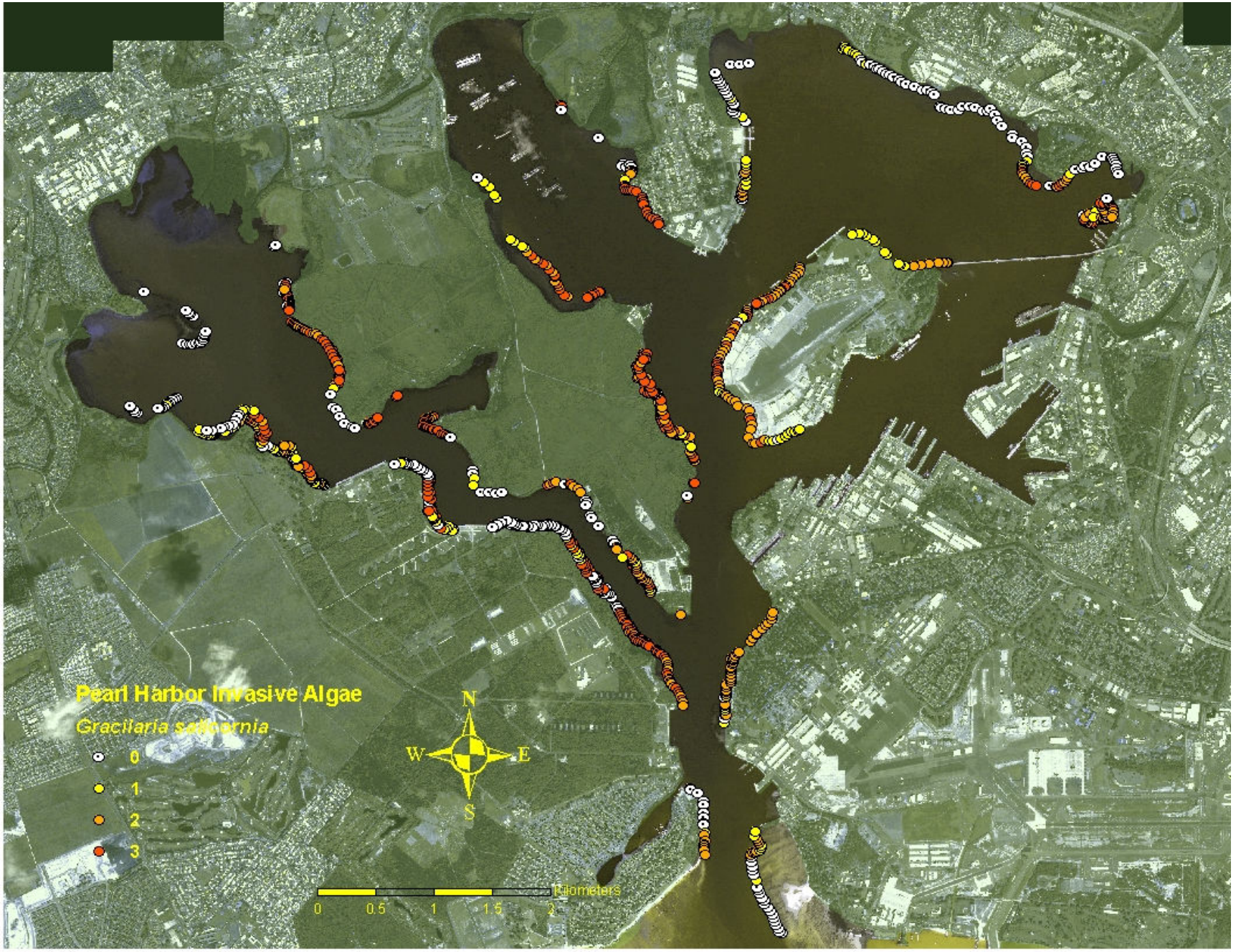


Figure 12. Distribution of *Gracilaria salicornia* in Pearl Harbor determined from snorkeling surveys, 2007-2008.

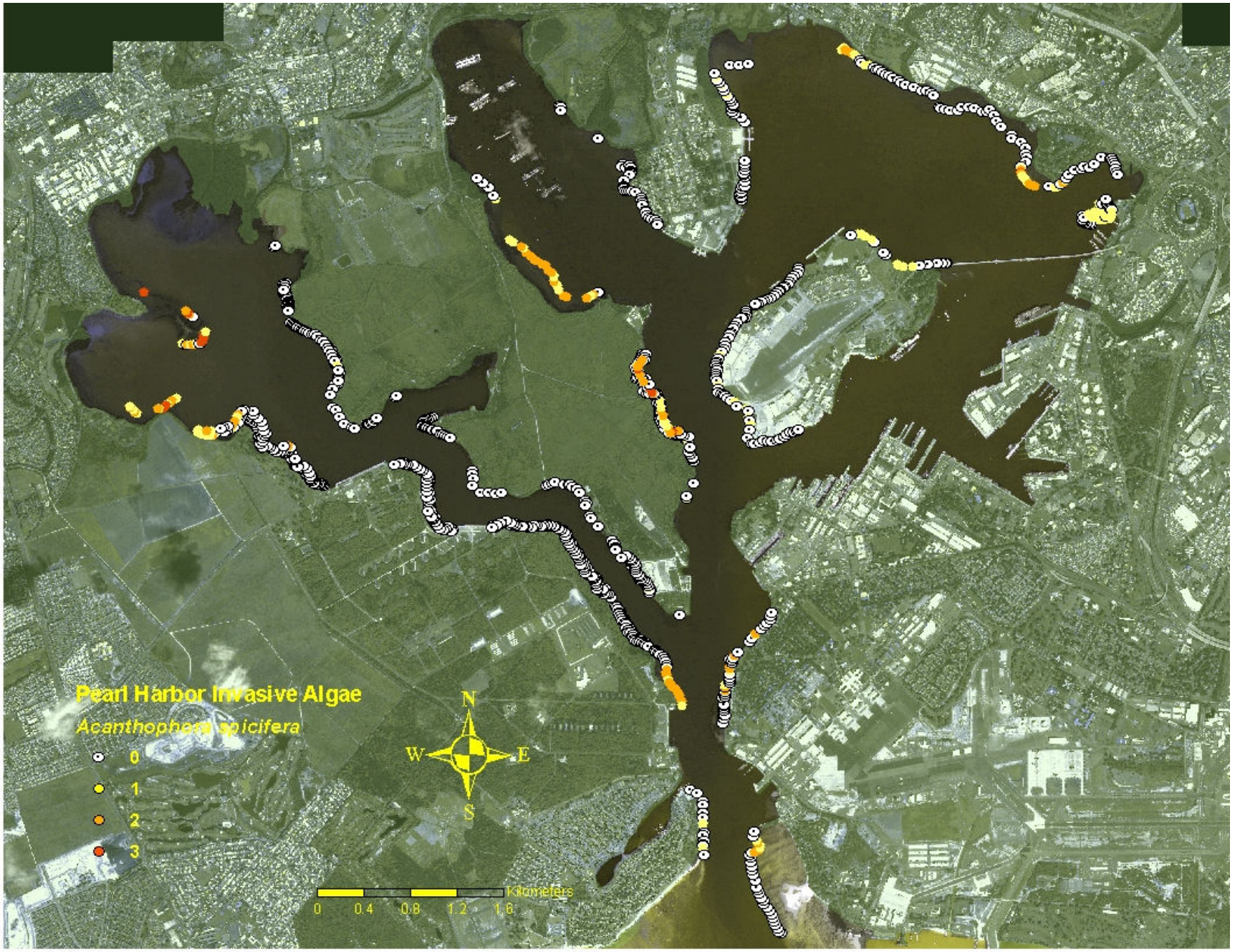


Figure 13. Distribution of *Acanthophora spicifera* in Pearl Harbor determined from snorkeling surveys, 2007-2008.

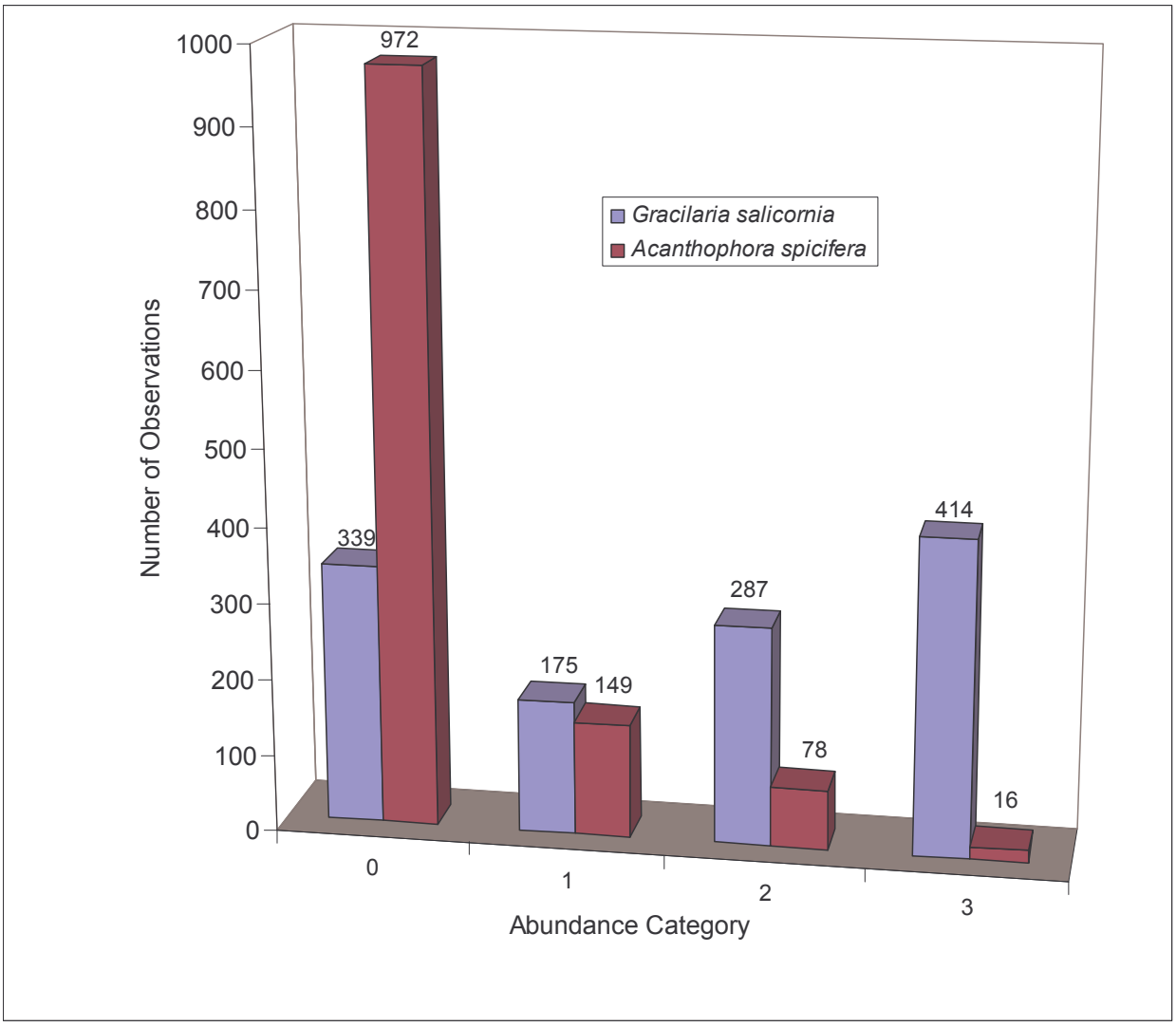


Figure 14. Frequencies of occurrence of *Gracilaria salicornia* and *Acanthophora spicifera* in the four abundance categories for the 1215 observations made in Pearl Harbor.

Gracilaria and none had *Acanthophora*, and *Gracilaria* was relatively abundant in 1996 only at Station 2 along Waipi‘o Peninsula and station 8 near the Pan Am Clipper landing at Waiawa Peninsula.

Invasive algae surveys were also conducted in Ke‘ehi Lagoon 2008 using the same technique as used in Pearl Harbor. A total of 768 observations were made on the reef area seaward of the northwest seaplane runway and on the reef outside of the lagoon east of the Honolulu International Airport Reef Runway. The distributions by category for the two algae species is shown in Figures 15 and 16 and the frequencies by category in Figure 17. In contrast to the pattern found for Pearl Harbor, *Acanthophora spicifera* dominated *Gracilaria salicornia* at Ke‘ehi Lagoon sites. For *Gracilaria* 443 (57.7%) of the 768 observations had no algae, 207 (26.9%) were Category 1, 104 (13.5%) Category 2 and only 14 (1.8%) were in Category 3. All *Gracilaria* observed were on the inner lagoon reef or on the landward side of the outer reef, with abundance decreasing to zero going seaward. By contrast *Acanthophora* was present at

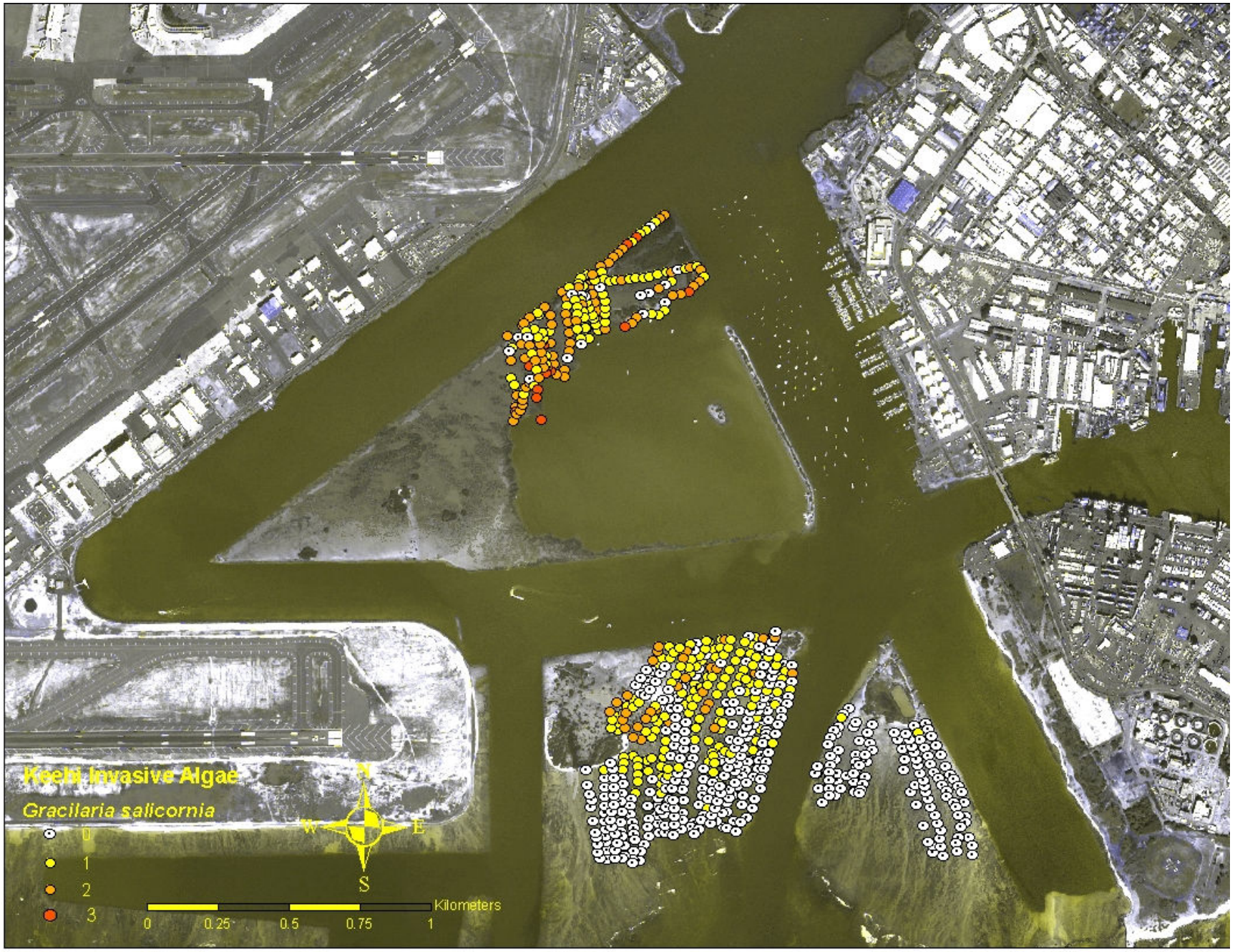


Figure 15. Distribution of *Gracilaria salicornia* in Ke‘ehi Lagoon determined from snorkeling surveys, 2007-2008.

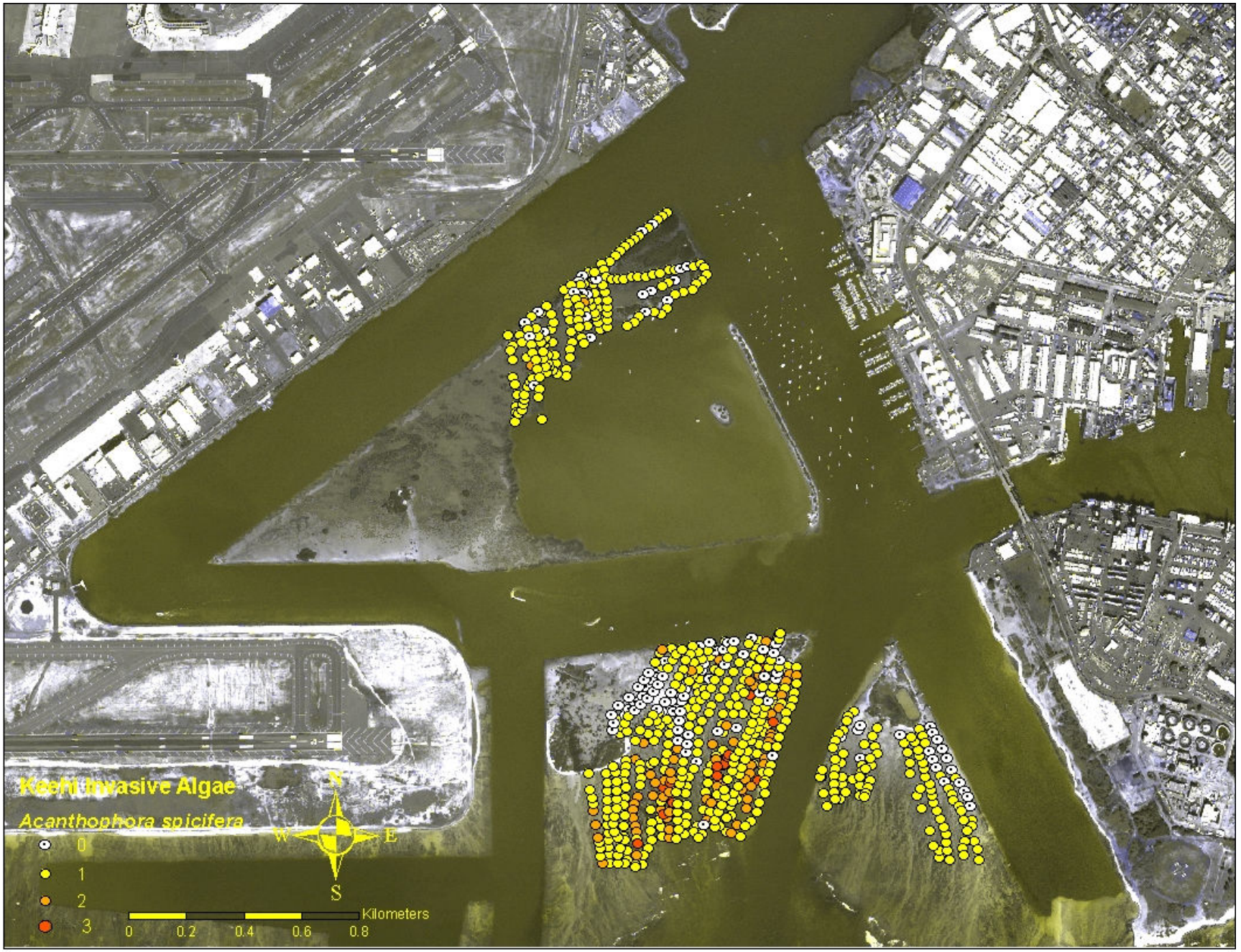


Figure 16. Distribution of *Acanthophora spicifera* in Keʻehi Lagoon determined from snorkeling surveys, 2007-2008.

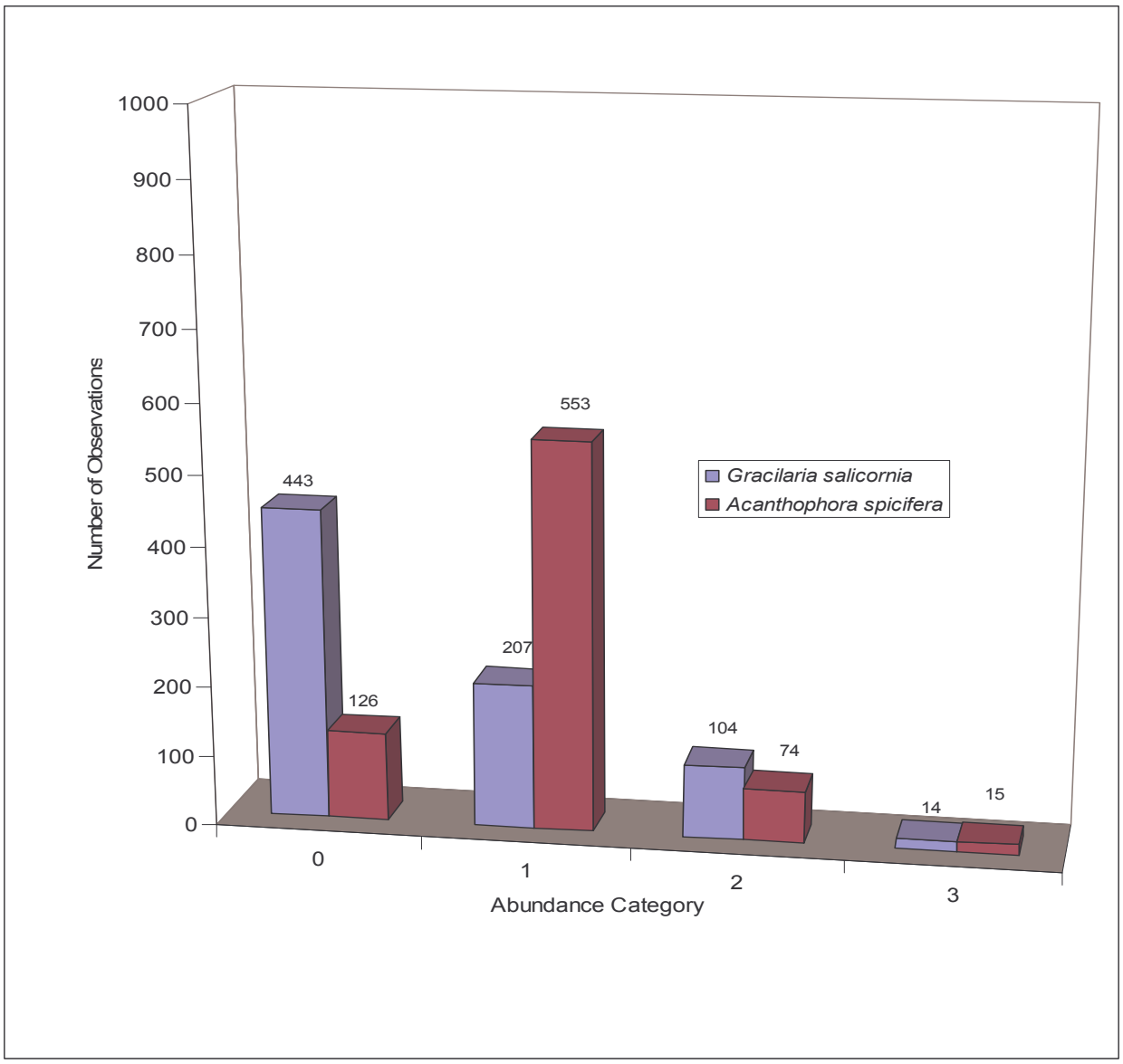


Figure 17. Frequencies of occurrence of *Gracilaria salicornia* and *Acanthophora spicifera* in the four abundance categories for the 768 observations made in Ke'ehi Lagoon.

439 (56%) of the 778 sites and increased in abundance going seaward on the outer reef, where it occurred at all locations. These distributions are clearly related to the propensity of *A. spicifera* to proliferate on high energy reefs subject to wave turbulence, while *G. salicornia* does not recruit or grow well under such conditions..

D. Reef Corals

Reef corals occurring at the 14 stations in Pearl Harbor were recorded and photographed as part of the observation and sampling protocol used on the diving surveys in the harbors, similar to the methodology followed on the 1996 Legacy Project surveys (Coles et al. 1997). In addition, searches for corals were made while snorkeling in conjunction with surveys for invasive algae throughout the perimeter of much of

Pearl Harbor. Whenever a live coral was encountered its species was noted, its GPS coordinates were recorded with a Garmin 76 carried by the snorkeler in a waterproof bag, and the coral was usually digitally photographed. GPS points were later downloaded to a computer and mapped using ArcMap 9.1 GIS software.

The species of corals that were found at any of the 14 observation and sampling sites surveyed in both 1996 and in 2007-2008 in Pearl Harbor are listed in Table 5.

Table 5. Corals observed on Pearl Harbor collection sites in 1996 and 2007-2008.

	1		2		7		11		12		13		14		15	
Coral Species	96	08	96	08	96	07	96	08	96	08	96	08	96	08	96	07
Pocillopora damicornis	x	x	x									x				
Pocillopora meandrina	x	x					x									
Monitipora capitata		x														
Monitipora patula	x															
Porites compressa		x	x	x								x				
Leptastrea purpurea				x	x	x			x			x	x		x	
Total	3	4	1	2	1	1	1	0	1	0	0	3	1	0	1	1

By comparison the corals that were observed on the six stations surveys in Honolulu Harbor and Ke‘ehi Lagoon in 2008 are compared with corals found at those sites in 1997 in Table 6.

Table 6. Corals observed on Honolulu Harbor and Ke‘ehi Lagoon collection sites in both 1996 and 2008.

	8		11		14		19	
Coral Species	1997	2008	1997	2008	1997	2008	1997	2008
Pocillopora damicornis	x	x	x	x	x	x		
Pocillopora meandrina	x	x			x	x		
Monitipora capitata	x	x		x	x	x		
Monitipora patula	x	x		x	x	x		
Porites compressa	x	x	x	x	x	x		
Porites lobata/lutea	x	x	x	x	x			
Pavona varians	x			x	x	x		
Leptastrea purpurea	x	x	x	x	x			x
Total	8	7	4	6	8	7	0	1

Both harbor areas show similar numbers of coral species and species compositions at most of the same sites during both sampling years. Pearl Harbor Station 1, near the harbor’s entrance had the most species of any site in Pearl Harbor, with three species in 1996 and four in 2008. Station 2, near the entrance to West Loch had the only *Porites compressa* found on the 1996 surveys (Figure 18), as well as many colonies of *Pocillopora damicornis*. The colony of *P. compressa* found at Station 2 in 1996 had grown substantially by 2008 (Figure 19), but the *Pocillopora damicornis* that were abundant at this site in 1996 (Coles 1999) were not found in 2008, apparently having been overgrown and killed by the invasive *Gracilaria salicornia* algae that covers the bottom at this site at depths shallower than where the *P. compressa* colony occurs.

The distribution of corals found at collection sites in 1996 are shown in Figure 20 and in Figure 21 for 2007-8, which also shows the species and locations of corals found on snorkeling surveys in 2007-8. Although it is not possible to rigorously compare the findings between the two sampling periods because the 2007-8 results include snorkeling survey observations, it is clear that reef corals in 2007-8 are far more common and widely distributed than indicated by the 1996 collection survey. The most common and widespread species is *Leptastrea purpurea*, a hardy coral that was especially common in 2008 along the east shores of Waipiʻo and Waiawa Peninsulas and the west shore of Ford Island, along the main channel into Middle and East Lochs. However, virtually all of these corals were less than 5-10 cm in diameter (Figure 22). Brock (2007) also reported in 2007 small colonies of *L. purpurea* in the vicinity of Rainbow Bay Marina and along the west shore of Ford Island, southwest of the present study's Station 13. The second most common species was *Pocillopora damicornis*, which increased in numbers from Ford Island and Waipiʻo Peninsula along the Main Channel toward the harbor entrance and also occurred in West Loch, where relatively large colonies of up to 0.5 m in diameter were found (Figure 23). A small colony of *P. damicornis* was also found by Brock (2007) on a sheet piling near the HECO discharge on surveys in 2001-2007. *Pocillopora meandrina* occurred in the present study at only two locations near the harbor entrance, at Station 1 where it was found in 1996 and at one site across the channel closer to the entrance (Figure 24). *Montipora capitata* (Figure 25) occurred at one location in West Loch and another near Station 7 east of Waipiʻo Peninsula, where a single colony of *Montipora patula* was also found.

The most significant finding from the snorkeling surveys for the present study was the discovery of four relatively large (ca 10-`5 m diameter) *Porites compressa* reefs (Figures 26-29) located well into West Loch along the west side of the channel. This is the furthest into West Loch that corals have been found, despite conditions that are hardly hospitable to coral survival and growth, i.e. highly turbid water, a bottom otherwise composed of fine silt sediments and abundant growth of invasive algae *Gracilaria salicornia*. Also, the *Porites compressa* on these reefs have moderate to abundant growths of the invasive sponge *Mycale grandis*, which has had a negative competitive impact on corals in Kāneʻohe Bay, Oʻahu (Coles and Bolick 2007), and another competing sponge tentatively identified as *Hymeniacidon* sp. Nonetheless, these *Porites* reefs are apparently surviving these challenging environmental conditions and have apparently been growing for decades, if not centuries, judging from the size of the reefs.

The patterns of coral distribution shown for the six stations resurveyed in Honolulu Harbor and Keʻehi Lagoon indicate that more species were found there than on the present surveys in Pearl Harbor, and that little change has occurred since the last survey in 1997. Some species, e.g. *Pavona varians* and *Leptastrea purpurea*, had differences between 1997 and 2008, but these were rare and cryptic and could have been missed during either survey. The finding of *L. purpurea* at Station 19 marks the first report for reef coral in Keʻehi Lagoon.

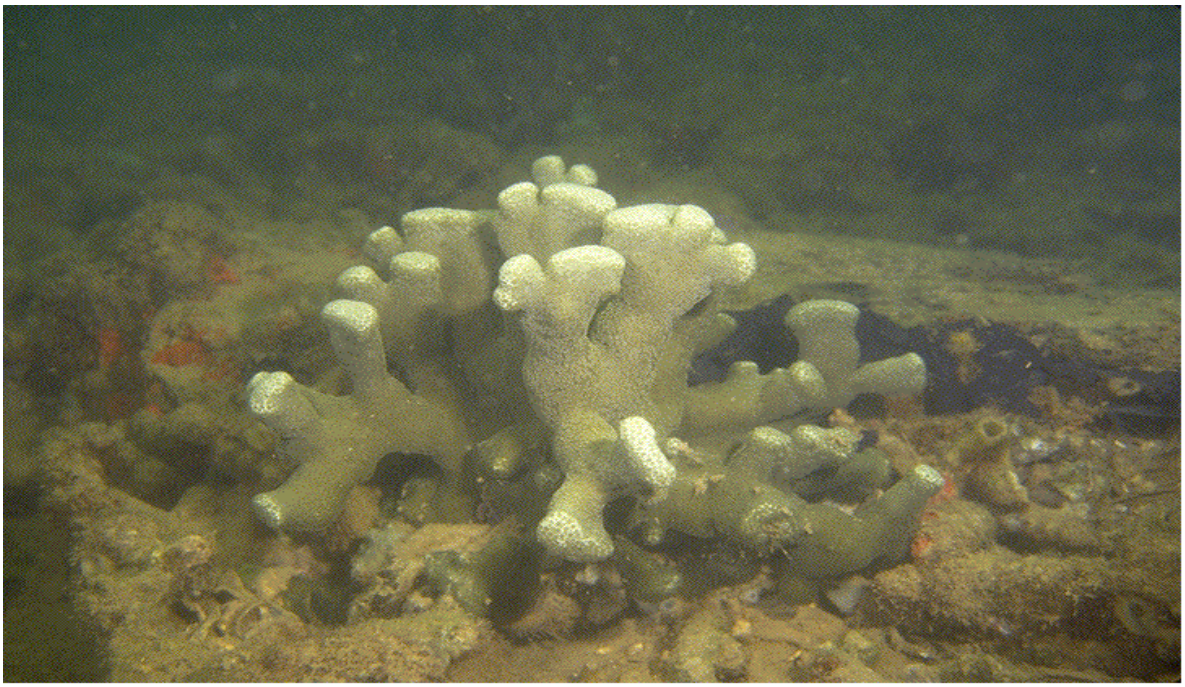


Figure 18. *Porites compressa* coral at Station 2, West Loch Channel at 4 m depth, April 1996.

Figure 19. Same *Porites compressa* colony at Station 2, January 2008.

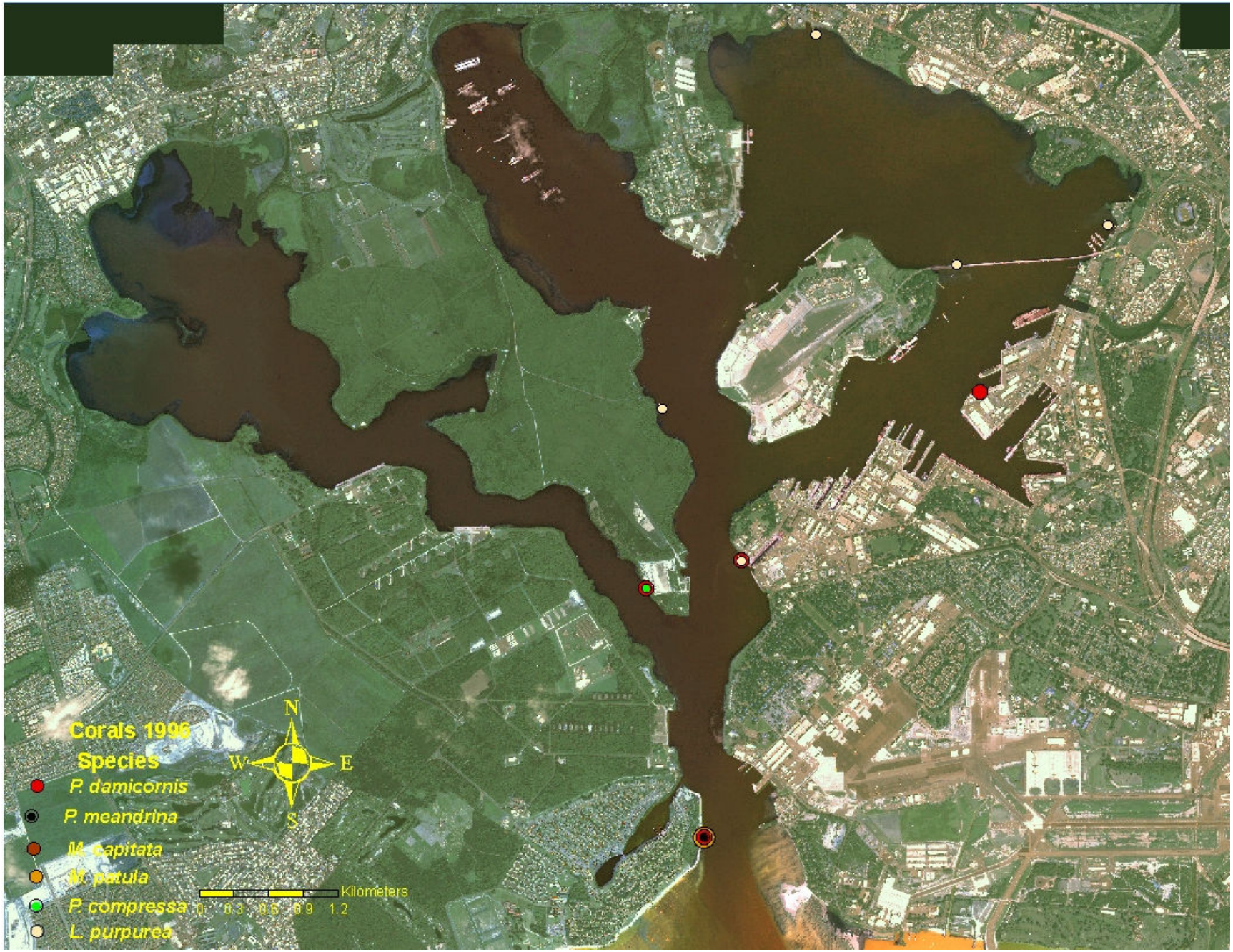


Figure 20. Pearl Harbor corals at collection stations in 1996.

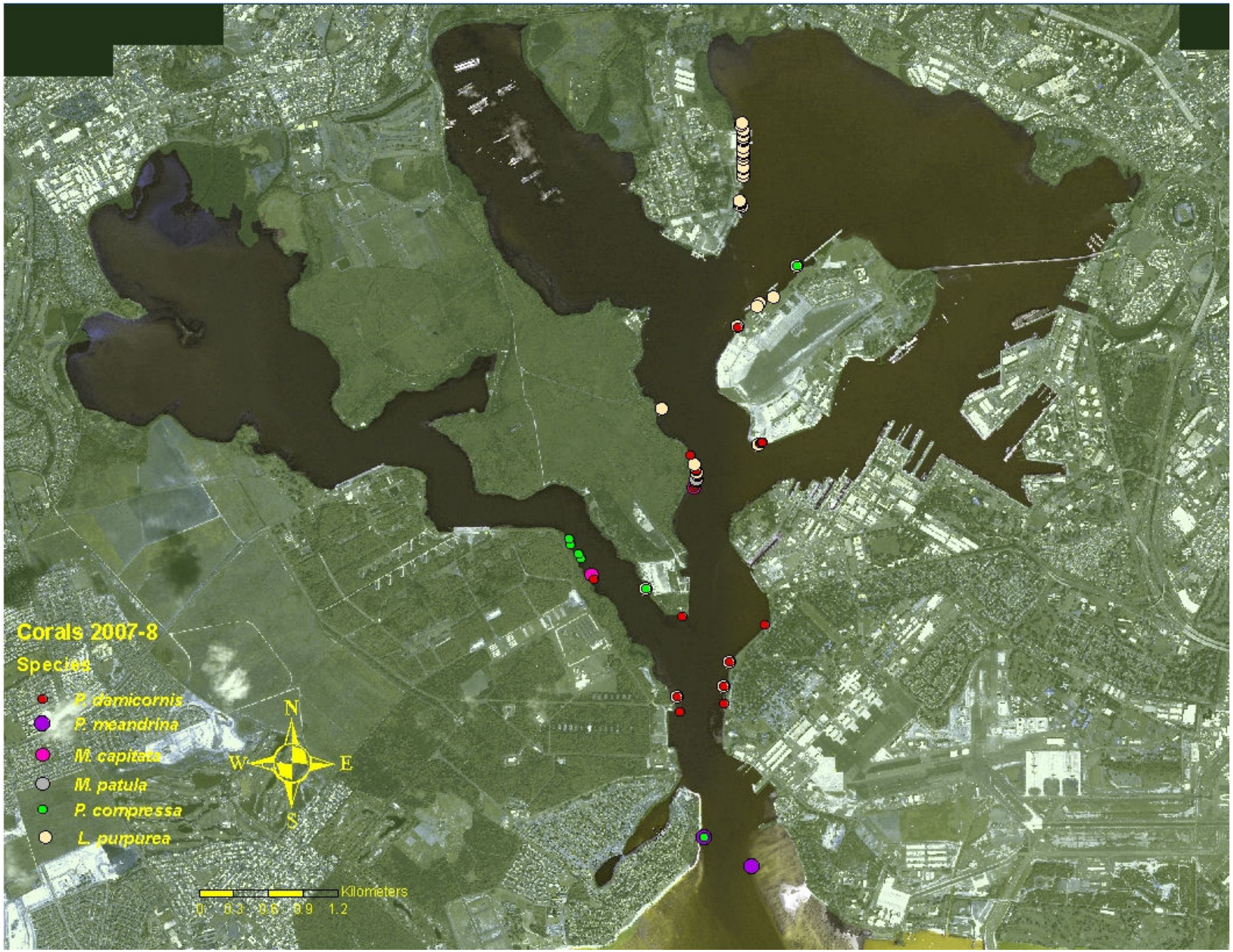


Figure 21. Pearl Harbor corals at collection stations from snorkel surveys in 2007-2008.

Figure 22. *Leptastrea purpurea* colony ca. 5 cm diameter near Waipi‘o Peninsula June 12, 2008.

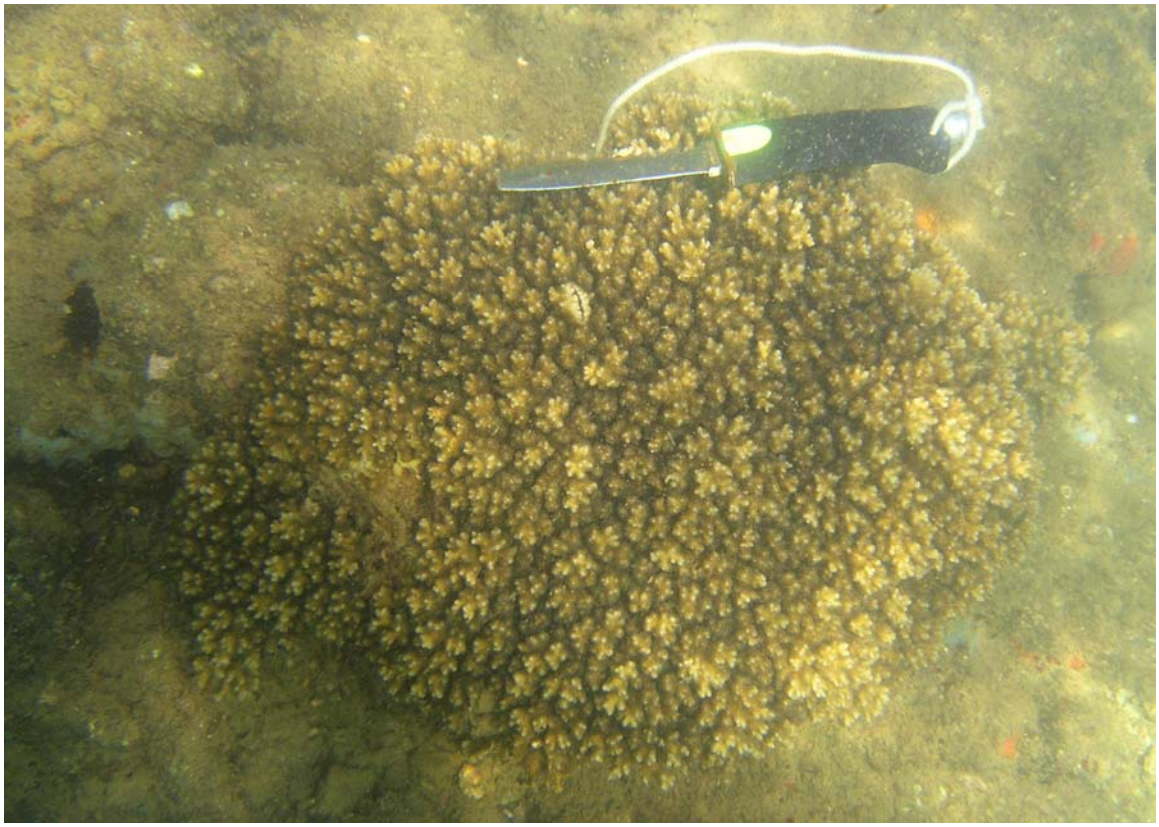


Figure 23. *Pocillopora damicornis* colony ca 0.5 m diameter near West Loch entrance, November 27, 2007.

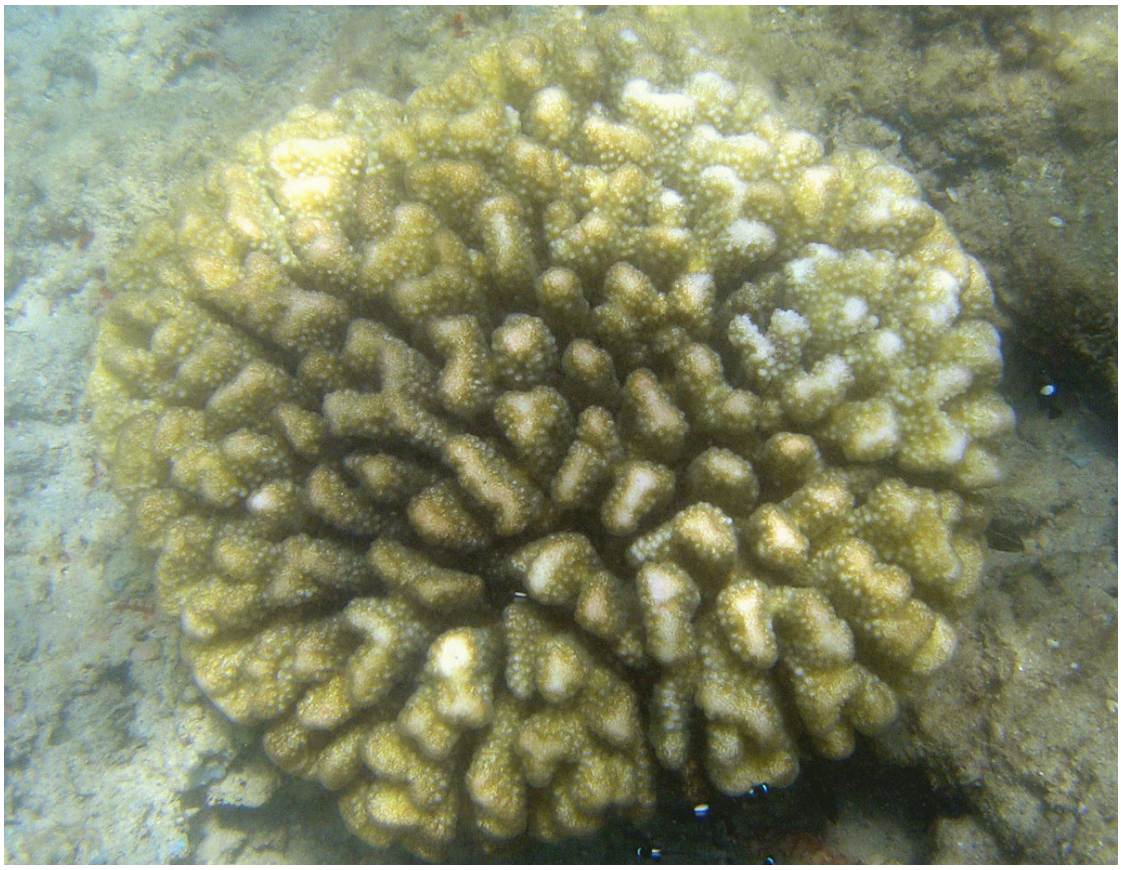


Figure 24. *Pocillopora meandrina* colony ca 0.5 m diameter near harbor entrance June 12, 2008.

Figure 25. *Montipora capitata* colony in West Loch November 27, 2007.

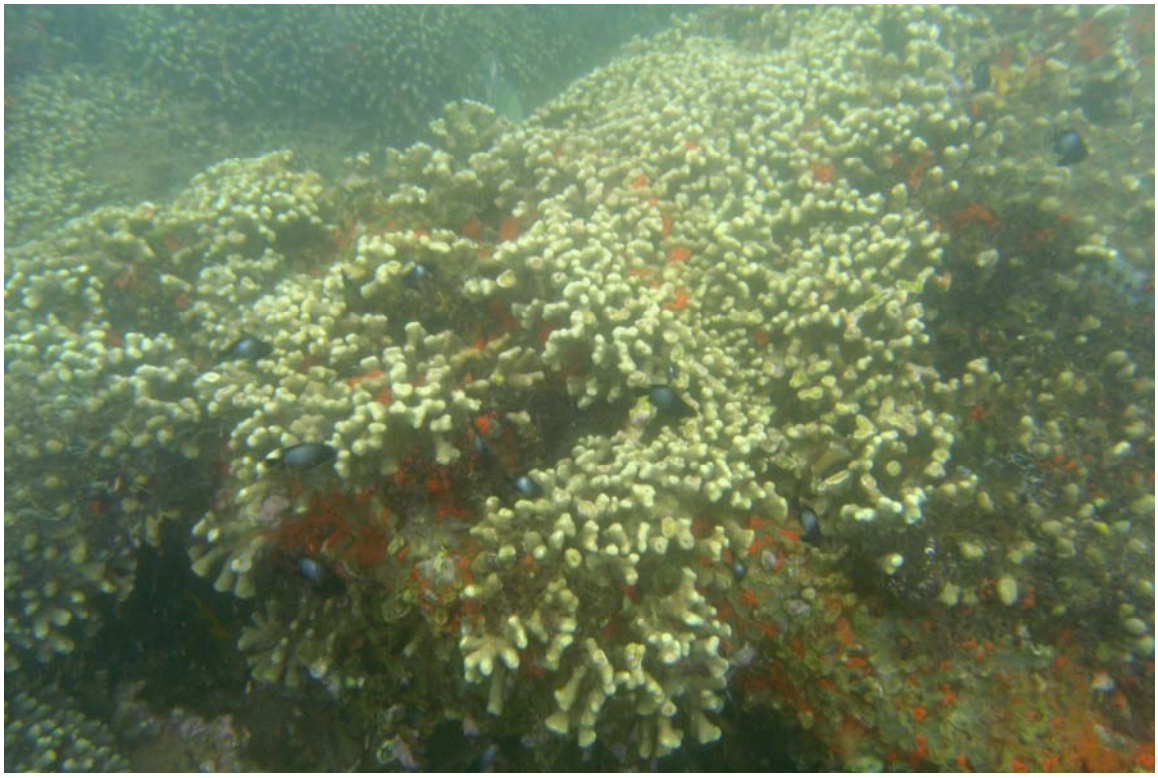


Figure 26. *Porites* Reef 1 in West Loch November 27, 2007.

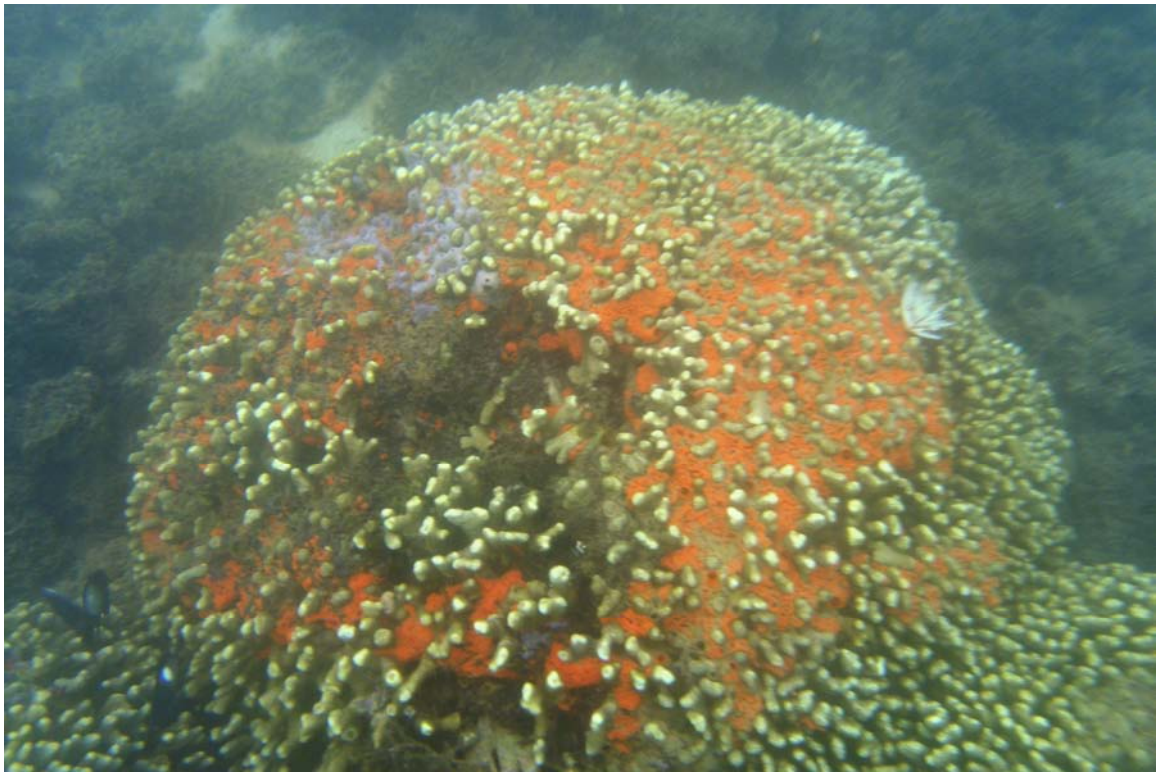


Figure 27. *Porites* Reef 2 in West Loch November 27, 2007 with heavy growth of *Mycale grandis* sponge.

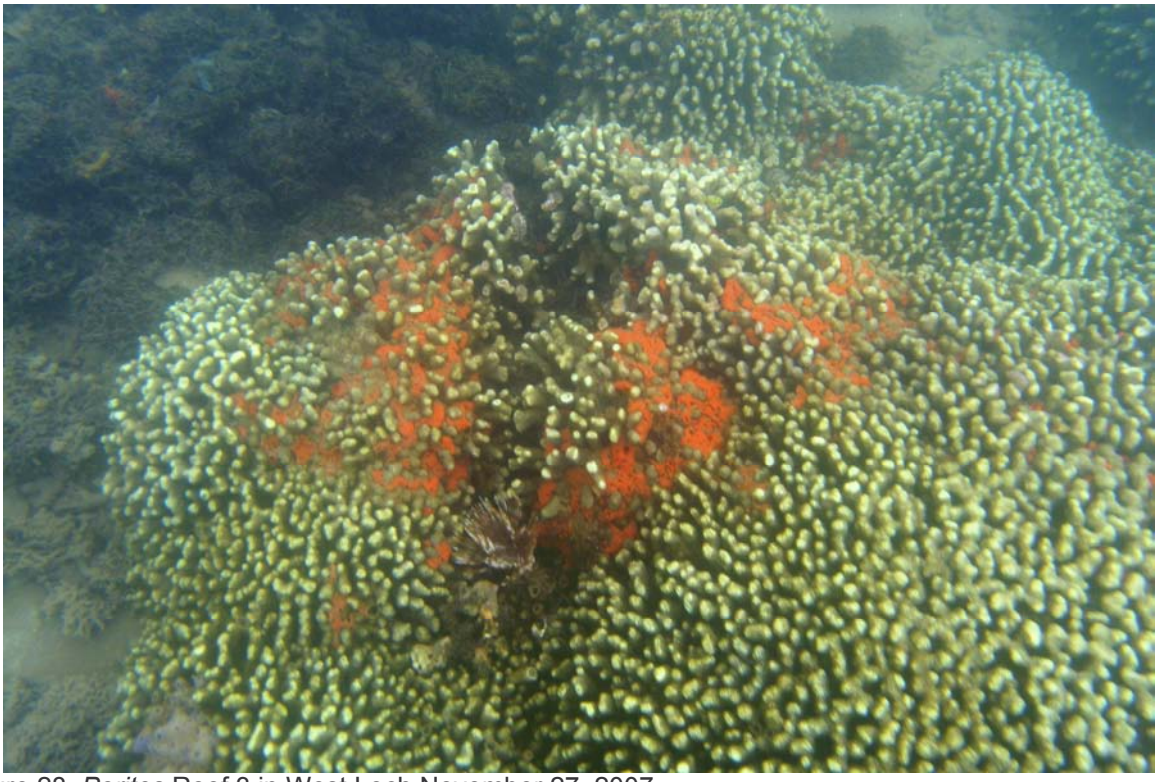


Figure 28. *Porites* Reef 3 in West Loch November 27, 2007.

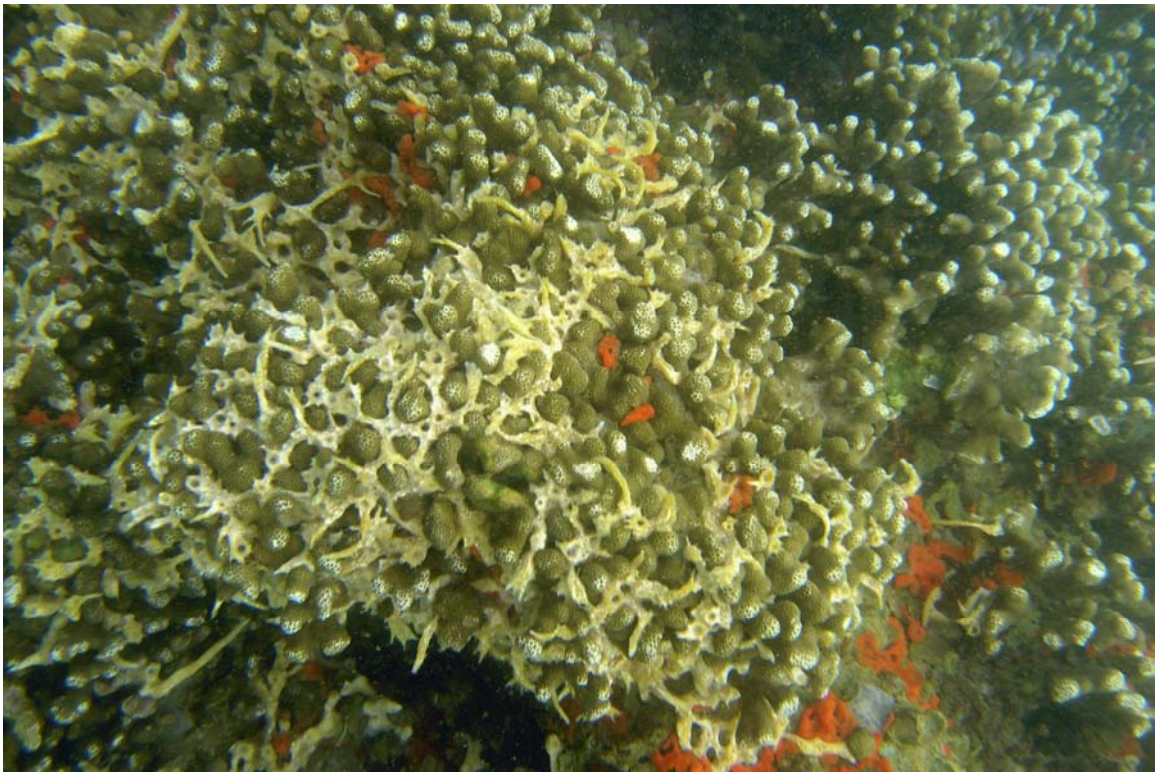


Figure 29. *Porites* Reef 4 in West Loch November 27, 2007 with growth of *Hymeniacidon sp.* sponge (tentative identification).

IV. DISCUSSION

Pearl Harbor is the major U.S. Navy base and shipyard in the Pacific Ocean between the west coast of the United States and the territory of Guam and has been an active port of call for Navy ships for nearly a century. Foreign ships have been coming to Honolulu Harbor for over 200 years since European arrival in Hawai‘i. Thus there has been ample opportunity for introduced marine species to reach these Hawaiian ports, and this was reflected by the relatively large component of introduced and cryptogenic species that were determined in the two previous studies in the harbors for surveys conducted in 1996 and 1997 (Coles et al. 1997, 1999a, 1999b). These studies each found approximately 100 introduced or cryptogenic species comprising 17-22% of the total biota identified. This is substantially less than the 359 introduced and cryptogenic species that were identified at that time in San Francisco Bay (Cohen and Carlton 1998), but much more than the 46 introduced and cryptogenics found in Guam’s Apr Harbor (Paulay et al. 2002) or the 26 that were found in Pago Pago Harbor, American Samoa (Coles et al. 2003).

Using less intensive sampling than was done in 1996 and 1997, the present study identified 298 taxa from observations and collections at 14 sites in Pearl Harbor and 195 taxa from six sites in Honolulu Harbor-Ke‘ehi Lagoon. Numbers of taxa per station generally increased with approach to the harbor mouths, reflecting the influence of open ocean circulation that favors the development of benthic and fish communities that included species found in both harbor and coral reef environments. This pattern was also found in the previous studies of the harbors, in Kāne‘ohe Bay, O‘ahu Hawai‘i (Coles et al 2002) and at Pago Pago Harbor, American Samoa (Coles et al 2003). Of the total taxa identified, 32% were introduced or cryptogenic genera or species in Pearl Harbor and 36% in Honolulu Harbor-Ke‘ehi Lagoon. Although these introduced or cryptogenic percentages are higher than were determined in the previous studies, they do not reliably indicate that their proportions of the total biota are significantly higher than 10 years ago in either harbor area, since fewer total taxa were identified from observations and collections than in either previous study. The results suggest, however, that introduced and cryptogenics occur frequently and are widely distributed among most stations in both harbors, especially since their proportions of the total taxa identified at most stations substantially exceeded the means for the two harbor areas.

The 1996 survey of Pearl Harbor identified 166 taxa not previously reported in the harbor and the 1997 survey of Honolulu Harbor-Ke‘ehi Lagoon identified 190 that had not been reported in those areas. The present study added 75 taxa for Pearl Harbor and 41 for Honolulu Harbor-Ke‘ehi Lagoon. These increases are largely due to focus in the present study on sponges (Porifera), hydroids (Hydrozoa) and tunicates (Ascidacea) that were identified by taxonomic experts not available for the earlier studies. Most of the new reports for the present harbor areas were previously known in Hawai‘i and only 17 genera or species are new reports for the Hawaiian Islands. These have been tentatively designated cryptogenic species, in consultation with taxonomists familiar with their worldwide distributions.

The 1996 survey of Pearl Harbor identified 96 introduced or cryptogenic species (Coles et al 1997) later revised to 95 species (Coles et al 1999a) and 69 were identified in the 1997 survey of Honolulu Harbor-Ke‘ehi Lagoon (Coles et al 1999b). The present study increases the number not previously reported in

Pearl Harbor by 37 and by 33 in Honolulu Harbor-Keʻehi Lagoon, The 17 new reports that are designated cryptogenic consist of eight sponges, three hydroids, two polychaete worms, two mollusks and two tunicates. Most of these are organisms with limited planktonic residence times that are likely to have been introduced through anthropogenic means, possibly as hull fouling. However, it is quite possible that they have been present in the harbors for a long time and that they have now been identified because of the additional taxonomic attention that was directed to these groups in the present study. The amount of new attention given to any taxonomic group can significantly influence the numbers of species and new reports for a location and therefore the estimates of cryptogenic taxa based on those new reports.

Most of the total 135 introduced or cryptogenic species found in either Pearl Harbor or Honolulu Harbor-Keʻehi Lagoon in this study are considered noninvasive and, although widespread in the harbors, do not proliferate to a point that they exclude native species or invade marine environments outside of the quiescent conditions in harbors or enclosed embayments. However, one flowering plant, two red algae, one sponge, one octocoral, one barnacle and one stomatopod found on the study are considered invasive and have altered some nearshore ecosystems with various levels of resource monopolization and competition with native organisms in these harbor areas and elsewhere in Hawaiʻi. It should be noted, however, that the consideration of an introduced species as noninvasive can change any time, since it takes at least a decade for a species to show invasive characteristics after it has been introduced. For example, neither Hawaiʻi's most invasive invertebrate *Carijoa* aff. *riisei* was considered invasive at the time of the of the last Pearl Harbor study, and it has since become recognized to theaten Hawaiʻi's Clack Coral industry and appears to be continuing to proliferate through the Main Hawaiian Islands (Grigg 2003, 2004).

Of the invasive species found in the present study, the Red Mangrove *Rhizophora mangle* is the most conspicuous in Pearl Harbor and Keʻehi Lagoon, occurring along most interior shorelines that have not been altered or hardened by pier or jetty construction. This species is native to the western Atlantic and Caribbean and was introduced from Florida to southwestern Moloka'i in 1902 by the American Sugar Company to stabilize mudflats and as a source of honey flora (MacCaughey 1917, Wester, 1981). It was first observed on Oʻahu in 1922 in a Kalihi fishpond as a single plant planted "many years ago" (Wester, 1981) and in flourishing condition at the time of the 1922 observation. It is not known whether it spread naturally from that location near the present study's Station KL20 to Pearl Harbor, or if it was introduced by further unrecorded plantings, but by 1946 it was established at the heads of all three lochs in Pearl Harbor (Fosberg 1948; Chimner et al. 2006). Unlike most of the world, where mangroves are considered to provide valuable habitat and shoreline protection, in Hawaiʻi *R. mangle* is considered an invasive pest that reduces habitat for endangered aquatic birds and native species, overgrows fish ponds, and substantially alters natural shorelines (Allen, 1998, Chimner et al. 2006). Chimner et al. (2006) found that mangroves were expanding from 1977-2001 at an average rate of 2.3-3.4% year in areas where they occur on Oʻahu, and that approximately 70% (102 hectares) of all mangroves on Oahu in 2001 occurred in Pearl Harbor.

The orange keyhole sponge *Mycale grandis* was first reported in Hawaiʻi (as *Mycale armata*) at 12 sites in Pearl Harbor in the 1996 survey (.Coles et al. 1997, 1999a). It has since been found in virtually all of Hawaiʻi's harbors (Coles et al. 1999b, 2004) and is a highly invasive competitor with native corals in

Kāne‘ohe Bay (Coles and Bolick 2007a, 2007b). In the present study it occurred at 12 of the 14 sites in Pearl Harbor and two sites in Ke‘ehi Lagoon. Moreover, it is apparently competing with *Porites compressa* on the reefs reefs that were first discovered in West Loch in the present study (Figures 28-31), similar to Kāne‘ohe Bay where this sponge dominates corals on some reefs in the south bay and was determined to be increasing its coverage by up to of 12% per year (Coles and Bolick 2007a, 2007b). The original species name used in Hawai‘i for this sponge of *Mycale armata* is a junior synonym of *Mycale grandis* (Hadju, pers. comm.), which has a natural distribution is from the Great Barrier Reef to the Red Sea, and it probably was introduced here sometime after the 1960s. It’s distinctive morphology and bright color is almost certain assurance that it would have been noted by previous sponge taxonomists working in Hawai‘i, and that it is therefore a recent introduction that is having an invasive impact on native Hawaiian corals tand their habitat.

The snowflake octocoral *Carijoa* aff. *riisei* occurred at four stations in Pearl Harbor in the present study and was reported at eight sites in the 1996 survey of Pearl Harbor. It was not seen at any of the present study’s Honolulu Harbor-Ke‘ehi lagoon sites, but it was reported at nine of the 15 sites surveyed in Honolulu Harbor in 1997, including the present study’s Stations HH8 and HH14. The first documented report of *Carijoa* aff. *riisei* was from Pearl Harbor in 1972 as *Telesto riisei* (Evans et al. 1974, Devaney and Eldredge 1977, Coles and Eldredge 2002) and it was later reported from coral reef sites around O‘ahu from Koko Head to Hale‘iwa and in harbors throughout the Hawaiian Islands (Coles et al. 2004). It commonly occurs in caves and under ledges along O‘ahu’s north shore and has been reported by sport divers in offshore areas around most of the main Hawaiian Islands (Kahng 2006). It was originally believed to be the Caribbean species *Carijoa riisei* based on taxonomic characteristics, but recent genomic analysis has shown that it is genetically distinct from Caribbean *Carijoa,* and results suggest that there have been multiple introductions from various Pacific locations (Concepcion et al. Ms in review). Previous considered by Coles and Eldredge (2002) to be “a relatively benign introduction occupying previously underutilized habitat” in harbors, under ledges and in caves along reef slopes, more recent information indicates *Carijoa* to be the most invasive introduced invertebrate with the most serious ecological and economic impact that occurs in Hawai‘i (Grigg 2003, 2004, Kahng and Grigg 2005). It continues to be reported at new sites on reefs throughout the Hawaiian Islands, but it is at depths of 80-100 m in the channel between Maui and Lana‘i that it is having its greatest impact by overgrowing black coral trees (*Antipatharia* sp.) which provide a source of larval replenishment for black corals that are harversted in shallow depths for jewelry production. Black coral colonies up to 4 m tall in the affected depths are usually completely covered and killed by the *Carijoa* octocoral, which is highly fecund and grows rapidly in reduced light (Kahng et al. 2008). However, in the area of the present study it as yet appears to be a relatively minor component of the total fouling communities that inhabit the harbors.

The Caribbean barnacle *Chthamalus proteus* that was recorded at 11 Pearl Harbor stations and one Honolulu site in the present study was also recorded at 11 Pearl Harbor sites in 1996 and six Honolulu Harbor-Ke‘ehi Lagoon sites in 1997. *C proteus* is native to the western Atlantic from the Caribbean to Brazil and is the best documented invertebrate introduction to Hawaiian waters (Southward et al. 1998, Zardus and Hadfield 2005, Zabin et al. 2007). It was first recorded in Kāne‘ohe Bay in 1995 (Hoover 1998) and later in Pearl Harbor in 1996 (Coles et al. 1997, 1999a), and was not present on O‘ahu when a comprehensive barnacle survey was done around the island in 1972-73 (Matsuda 1973). It now occurs in

extremely high densities (e.g. Figure 10f) in many enclosed harbors and embayments throughout the main Hawaiian Islands and has been recorded as far west as Midway (DeFelice et al 1997) at the end of the Northwestern Hawaiian Island and in Guam (Southward 1998). Although apparently it does not compete with or exclude any native Hawaiian species in its high intertidal habitat, it clearly alters the character of this environment where it occurs.

Although the Asian stomatopod *Gonodactylaceus falcatus* was observed at only one station in this study it is highly cryptic and undoubtedly is more widespread in the harbors, having been reported at five Pearl Harbor sites in 1996 and 14 of 20 sites in Honolulu Harbor-Keʻehi lagoon in 1997. It is also a well documented introduction to Hawaiʻi, having first been reported by Kinzie (1968) as not having occurred here before 1954 and possibly having come from the Philippines on concrete barges at the end of World War II. It is considered invasive (Coles and Eldredge 2002) based on its exclusion of smaller and less aggressive native stomatopod species from their normal coral rubble habitats. It is abundant and frequently found in Kāneʻohe Bay, where it was found at all 21 stations sampled from coral rubble (Coles et al 2002).

The two most problematic invasive introduced species found in this study were the red algae *Acanthophora spicifera* and *Gracilaria salicornia*. *A. spicifera* occurred at seven Pearl Harbor sites and one Honolulu Harbor site. In 1996 it was found at only two sites in Pearl and was not found in Hanolulu Harbor-Keʻehi lagoon in 1997. This species was the first introduced algae reported in Hawaiʻi, believed by Doty (1961) to have arrived on a barge brought to Pearl Harbor prior to 1950. It is now the most widespread introduced algae in the Hawaiian Islands and abundant from Hawaiʻi to Kauaʻl (Smith et al 2002). It also is probably the most tolerant algal species in Hawaiʻi to extreme environmental conditions, as witnessed by its survival in the most turbid sections of West Loch in Pearl Harbor where no other macroalgae and few invertebrate species were found in the present study. It appears to be continuing to spread in the tropical Pacific, having recently been first reported at Majuro Atoll in Micronesia (Tsuda et al. 2008). Its distributions as determined by the snorkeling surveys in the present study reflects its wide range of environmental tolerance, since it showed its maximal coverages in both interior and outer areas of Pearl Harbor and Keʻehi Lagoon.

Gracilaria salicornia is the most invasive species encountered in the present study and has shown a dramatic increase in Pearl Harbor since the last major survey in 1996. Its increased occurrence from three collection stations in 1996 to seven in 2007 is verified by the widespread occurrence and high abundance that was determined from snorkeling surveys throughout Pearl Harbor. It occurred for 72% of the over 1200 observations made throughout the harbor and it was in the highest abundance category for 34% of the obserations. Often these areas had “tumbleweeds” of *Gracilara* up to 0.5 m in diameter that were free to drift along the bottom and further spread the algae, at others locations the algae occurred in dense mats that virtually covered the bottom. This algae was not found in Honolulu Harbor or Keʻehi Lagoon in 1997 but did occur at one Keʻehi Lagoon station in 2008, and snorkeling surveys also showed high coverage in the inner lagoon outside of the seaplane runway and medium abundance along the outer lagoon. Although not generally as abundant as in Pearl Harbor, *Gracilaria* in Keʻehi Lagoon has still increased enough in the last decade to represent a phase shift in the biotope dominating organism.

This increasing dominance of nearshore environments by *Gracilaria* reflects the pattern that has occurred island wide on O‘ahu in the last three decades since it was introduced to Waikīkī in 1971 and to Kāne‘ohe Bay in 1978. It was found to rapidly increase its range along the south O‘ahu shoreline westward to Ala Moana Park and eastward to Diamond Head and Hawai‘i Kai between 2000 and 2002 (Smith et al. 2004). By 2000 it was found throughout Kāne‘ohe Bay (Rodgers and Cox 1999, Smith et al. 2002) and was found to have a continuous population at the south end of Kualoa Park in North Kāne‘ohe Bay in 2002 (Smith et al. 2004).

Attempts to remove this invasive alga in areas where it has become dominant have met with little success. In 2002 a collaboration that initially involved 62 volunteers began to remove *Gracilaria* from the reef and channels off Waikīkī. Five events between 2002 and April 200 removed over 20,000 kg of the algae (Smith et al. 2004). This effort continued until November 2006, eventually involving a total of >2500 volunteers and removed >120,000 kg (C. Hunter, pers. comm.). Unfortunately, the recovery and growth rate of this alga exceeded this concerted effort and *Gracilaria* still monopolizes the benthos off Waikīkī, with little visible decrease in its abundance. A subsequent effort has focused on using a mechanical device, the “Supersucker”, to remove *Gracilaria* and species of *Kappaphycus* from reefs in Kāne‘ohe Bay (Conklin et al. 2008). This device requires only a small group of trained operators and is efficient in removing large quantities of algae and epiphytic introduced invertebrates, reducing algal cover from 65% to 15% on two test sites, with continued decrease in algal cover following removal at two test sites. However, given the magnitude and extent of the coverage that has been determined along sounth O‘ahu shores and now in Pearl Harbor, it is unlikely that this removal method could provide a long-range cost-effective solution.

On a more positive note, reef corals have apparently continued settlement and growth that was noted in the 1996 Legacy study (Coles et al. 1997, Coles 1999) and earlier by Brock (1994). The first comprehensive survey of the biota of Pearl Harbor was conducted in the early 1970s and sampled at 10 sites throughout the main channel, East and Middle Lochs and as far into West Loch as Station 2 of the present study. From that study Grovhoug noted in 1971-72 (in Evans et al 1974) that “stony corals were conspicuously absent from all biostations”. About 20 years later Brock (1994) first reported small colonies of *Leptastrea purpurea* corals from the west shore of Ford Island in 1993, and the 1996 Legacy study (Coles et al. 1997, 1999a) found the five coral species at the eight locations shown in Figure 22, which corresponded to the sites of eight of the ten stations surveyed by the Evans (1974) study.

Although similar species occurrences were recorded at the collection stations in the present study as in 1996 (Table 5), the snorkeling surveys showed a wider ranging distribution and greater abundance of corals in the harbor than anticipated (Figure 23). Also, Smith (2002) reported eight coral species to occur at five of the Evans (1974) sites and eleven species from a 2005 survey throughout the perimeter of much of the harbor (Smith et al. 2006). No information is provided on the distribution of these eleven species, and they include five *(Montipora flabellata, Leptoseris incrustans, Pavona varians, Porites lobata, Psammocora explanata*) that were not found on the present snorkeling surveys. Corals appear to be most common along the main channel leading into East and Middle Lochs and around Ford Island. Coral colonization in this area has even been noted recently in the news media, which reported hard coral

growing on the USS Arizona where none had been found during the most recent survey of the memorial ship in 1990 (Kakaesako 2009).

The single *Porites compressa* colony found in West Loch in 1996 has continued to grow and may achieve the size of a small reef if it continues to survive (Figure 21), and four large *Porites* reefs were found for the first time in the present study to occur well into West Loch. Smith et al (2006) also noted the presence of large (>100 cm diameter) *Porites compressa* colonies in West Loch in 2002 that they estimated were more than 50 years old. However, these corals had been overgrown by *Gracilaria salicornia* by the time of their 2005 survey. The location indicated for these *Porites* reefs on their site map in Smith (2006) appears to have been 250-500 m toward the West Loch entrance from the four large *Porites* reefs found on the present study. This suggests that *Porites compressa* reefs in West Loch were more extensive in the past, but those remaining are in jeopardy of being eliminated, either by the orange keyhole sponge *Mycale grandis*, or more likely by the continued proliferation of *Gracilaria salicornia*..

Overall the historical trends suggest that, despite previous reports to the contrary, that reef corals were present in Pearl Harbor prior to 1970. Their abundance and distribution range appear to have been increasing in the last 30 years due to increased water quality, but they face a continued threat from competition from introduced invasive species. Brock (2007) also noted a decline in coverage of the *Leptastrea purpurea* occurring along the west shore of Ford Island in 2001-2007 after due to competition from *Gracilaria.* Similarly, the group of *Pocillopora damicornis* colonies growing in shallower water in 1996 near the *P. compressa* shown in Figure 21 were not found in 2007, apparently having been overgrown by the *Gracilaria* mat that covers the bottom at that site.

In summary, the present study indicates that introduced species are still a major component of the total biota of Pearl Harbor, similar to or greater than was determined in the 1996 Legacy Study. Most of the species found were previously reported in the harbor either by the 1996 or by previous surveys. The relatively few newly found species designated cryptogenic may represent actual new introductions or be an artifact of greater focus on these taxonomic groups in the present study. A similar pattern was found for the stations surveyed in Honolulu Harbor-Keʻehi Lagoon, supporting the latter conclusion. However the disturbing proliferation and increasing dominance of the introduced algae *Gracilaria salicornia* and *Acanthphora spicifera* in Pearl Harbor and Keʻehi Lagoon is an unfortunate finding that reflects the steady spread of these invasive species around Oʻahu and ultimately, probably throughout the Main Hawaiian Islands. This is particularly unfortunate to be occurring in Pearl Harbor, where an apparent colonization of corals and incipient development of conditions that might support the development or restoral of coral reefs may be prevented by the domination of shallow depth by these highly invasive algae.

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APPENDIX A

Station Records for Organisms Collected or Observed in Pearl Harbor in 2007-2008
(Origin: I=Introduced, C=Cryptogenic, Blank Native)

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
Chlorophyta	*Cladophora sp.*								x								
Phaeophyta	*Dictyota sp.*								x								
Phaeophyta	*Lobophora variegata*	(J.V.Lamour.) Womersley													x		
Phaeophyta	*Padina sp.*														x		
Rhodophyta	*Acanthophora spicifera*	(Vahl)	**I**			x	x		x	x	x			x		x	
RHODOPHYTA	*Gelidiella sp.*								x								
RHODOPHYTA	*Gracilaria salicornia*	(C. Agardh) Dawson	**I**	x	x	x			x				x				
RHODOPHYTA	*Spyridia sp.*								x								
		Total Algae	8	1	1	2	1	0	6	1	1	0	1	1	2	1	0
RHIZOPHORACEAE	*Rhizophora mangle*	Linnaeus, 1758	**I**		x	x	x			x	x					x	x
CILIOPHORA	*Foraminifera unid. sp*			1													
PORIFERA	*?Ciocalypta sp. 1*						x										
PORIFERA	*?Clathria sp.*			x													
PORIFERA	*?Gelliodes sp.*												x				
PORIFERA	*?Halichondria sp.*																x
PORIFERA	*?Stylinos sp.*			x													
PORIFERA	*?Topsentia sp.*											x					
PORIFERA	*Biemna fistulosa*	(Topsent, 1897)	**C**	x	x			x	x	x		x	x	x	x		
PORIFERA	*Chelonaplysilla violacea*	(Lendenfeld, 1883)						x									x
PORIFERA	*Ciocalypta sp.*		**C**			x											
PORIFERA	*Cladocroce burapha*	Putchakarn, de Weerdt, Sonchaeng & van Soest, 2004	**C**					x		x		x		x		x	x
PORIFERA	*Clathria sp.*				x			x									
PORIFERA	*Dictyodendrilla sp.*												x				
PORIFERA	*Dysidea arenaria*	(Schmidt, 1862)	**I**	x	x			x	x	x		x		x	x	x	
PORIFERA	*Dysidea sp.*											x					
PORIFERA	*Gelliodes fibrosa*	(Wilson, 1925)	**I**					x				x		x			
PORIFERA	*Haliclona (Reniera) sp. 1*												x				
PORIFERA	*Haliclona (Reniera) sp. 2*							x									
PORIFERA	*Haliclona (Soestella) coerulea*	(Hechtel, 1965)	**I**	x	x			x	x	x	x	x	x	x	x	x	x
PORIFERA	*Haliclona sp.*								x								
PORIFERA	*Hamigera cf. sp.*								x								
PORIFERA	*Iotrochota purpurea*	(Bowerbank, 1875)	**C**	x													
PORIFERA	*Iotrochota sp.*				x				x		x		x		x		
PORIFERA	*Leucetta solida*	de Laubenfels, 1950		x													

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
PORIFERA	*Lissodendoryx similis*	Thiele, (1859)	**C**													x	
PORIFERA	*Monanchora clathrata*	Carter, 1883	**C**	x				x							x		
PORIFERA	*Mycale (Carmia) cecilia*	de Laubenfels, 1936	**I**							x						x	
PORIFERA	*Mycale (Mycale) grandis*	Gray, 1867	**I**	x	x	x		x	x	x	x	x	x	x	x	x	
PORIFERA	*Mycale (Zygomycale) parishi*	(Bowerbank, 1875)	**I**					x									
PORIFERA	*Mycale phyllophila*	Hentschel, 1911	**C**		x												
PORIFERA	*Petrosia sp.*			x													
PORIFERA	*Pseudosuberites sp.*															x	
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Hooper, 1991	**C**									x	x				
PORIFERA	*Strongylacidon kaneohe*	(de Laubenfels, 1950)								x							
PORIFERA	*Suberites aurantiacus*	(Duchassaing & Michelotti, 1864)	**I**			x			x		x	x	x	x		x	x
PORIFERA	*Tedania (Tedania) ignis*	(Duchassaing & Michelotti, 1864)	**C**		x				x	x		x		x		x	x
PORIFERA	*Topsentia halichondrioides*	(Dendy, 1905)	**C**	x				x	x				x				
		Total Sponges	36	11	8	3	x	12	10	8	4	11	10	9	6	9	6
CNIDARIA	*Actiniaria unid. sp.*				x	x				x	x			x			
CNIDARIA	*Aiptasia pulchella*	Carlgren, 1943									x				x	x	
CNIDARIA	*Bougainvillidae unid. spp.*											x					
CNIDARIA	*Campanularidae unid. sp.*							x		x		x				x	
CNIDARIA	*Carijoa cf. riisei*	(Duchassaing & Michelotti, 1860)	**I**	x				x					x	x			
CNIDARIA	*Clytia cf. gracilis*	(M. Sars, 1850)	**C**		x			x									x
CNIDARIA	*Clytia latitheca*	Millard and Bouillon, 1973	**C**									x					
CNIDARIA	*Corydendrium parasiticum*	(Linnaeus, 1767)	**C**									x	x				
CNIDARIA	*Halecium sp.*			x	x			x							x	x	
CNIDARIA	*Hydrozoa unid. sp.*																
CNIDARIA	*Leptastrea purpurea*	Dana, 1846			x				x						x		
CNIDARIA	*Montipora capitata*	(Dana, 1846)		x													
CNIDARIA	*Nereididae unid. sp.*									x							
CNIDARIA	*Obelia dichotoma*	(Linnaeus, 1758)	**I**													x	x
CNIDARIA	*Pennaria disticha*	(Goldfuss, 1820)	**I**	x	x			x				x	x			x	
CNIDARIA	*Phyllodocidae unid. sp.*											x					
CNIDARIA	*Pocillopora damicornis*	(Linnaeus, 1758)		x											x		
CNIDARIA	*Pocillopora meandrina*	Dana, 1846		x													
CNIDARIA	*Porites compressa*	Dana, 1846		x	x										x		
CNIDARIA	*Porites lobata*	Dana, 1846															
CNIDARIA	*Protopalythoa sp.*				x			x									
CNIDARIA	*Zoanthus sp. (white)*				x				x								
		Total Cnidarians	22	7	8	1	0	6	2	3	2	6	3	2	5	5	2

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
SIPUNCULA	*Phascolosoma stephensoni*	(Stephen, 1942)							x								
SIPUNCULA	*Sipuncula unid. sp.*					x									x		
		TotalSipunculids	**2**	0	0	1	0	0	1	0	0	0	0	0	1	0	0
POLYCHAETA	*?Potamilla sp.*							x		x			x	x	x		x
POLYCHAETA	*Amphiglena mediterranea*	(Leydig, 1851)	**C**								x						
POLYCHAETA	*Amphiglena sp.*		**C**				x				x						
POLYCHAETA	*Branchiomma nigromaculata*	(Baird, 1865)	**C**						x		x				x		x
POLYCHAETA	*Branchiomma sp.*																
POLYCHAETA	*Chaetopteridae unid. sp.*			1	x			x			x	x	x		x		x
POLYCHAETA	*Chaetopterus sp.*		**C**					x			x				x	x	
POLYCHAETA	*Cirratulidae unid. sp.*			1	x			x			x	x	x		x		x
POLYCHAETA	*Cirriformia sp.*											x					
POLYCHAETA	*Dorvilleidae unid. sp.*																x
POLYCHAETA	*Eunice antennata*	(Savigny, 1820)													x		
POLYCHAETA	*Eunice cariboea*	(Grube, 1856)						x									
POLYCHAETA	*Eunicidae unid. sp.*			x				x			x	x	x	x	x	x	x
POLYCHAETA	*Eurythoe complanata*	(Pallas, 1766)		x													
POLYCHAETA	*Glyceridae unid. sp.*																
POLYCHAETA	*Hydroides brachyacantha*	Rioja, 1941	**I**			x	x										
POLYCHAETA	*Hydroides crucigera*	(Morch, 1863)	**I**			x											
POLYCHAETA	*Hydroides dirampha*	(Morch, 1863)	**I**			x	x				x						
POLYCHAETA	*Hydroides elegans*	(Haswell, 1883)	**I**	x	x		x				x	x	x	x	x		x
POLYCHAETA	*Hydroides sp.*				x							x		x			x
POLYCHAETA	*Loimia medusa*	(Savigny, 1818)							x					x			
POLYCHAETA	*Lumbrineridae unid. sp.*							x		x	x	x			x	x	
POLYCHAETA	*Lumbrineris dentata*	Hartmann-Schroder, 1965													x		
POLYCHAETA	*Marphysa corallina*	Kinberg, 1865													x		
POLYCHAETA	*Marphysa sp.*							x									
POLYCHAETA	*Nematonereis unicornis*	Schmarda, 1861										x					
POLYCHAETA	*Nereididae unid. sp.*			x	x	x		x	x	x	x			x	x		x
POLYCHAETA	*Perinereis curvata*	Holly, 1935															
POLYCHAETA	*Phyllodocidae unid. sp.*								x						x		
POLYCHAETA	*Pileolaria militaris*	Claparede, 1868	**I**		x												
POLYCHAETA	*Pomatoleios kraussii*	Baird, 1865	**I**			x	x										
POLYCHAETA	*Potamethus sp.*										x						
POLYCHAETA	*Potamilla sp.*				x												
POLYCHAETA	*Sabellastarte indica*	(Savigny, 1818)							x						x		
POLYCHAETA	*Sabellastarte spectabilis*	(Grube, 1878)	**I**	x				x	x	x	x	x	x	x	x	x	x

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
POLYCHAETA	*Sabellidae unid. sp.*			x	x		x	x	x	x	x	x	x	x	x		x
POLYCHAETA	*Salmacina dysteri*	(Huxley, 1855)	I	x	x			x	x	x			x	x	x		
POLYCHAETA	*Schistomeringos sp.*															x	
POLYCHAETA	*Serpula sp.*				x					x							
POLYCHAETA	*Serpula vermicularis*	Linnaeus, 1767	C			x	x			x		x					x
POLYCHAETA	*Serpulidae unid. sp.*			x			x										x
POLYCHAETA	*Simplicaria pseudomilitaris*	(Thiriot-Quievreux, 1965)	C		x												
POLYCHAETA	*Spinther japonicus*	Imajima and Hartman, 1964	C		x												
POLYCHAETA	*Spionidae unid. sp*									x							
POLYCHAETA	*Spionidae unid. sp.*							x									
POLYCHAETA	*Spirorbidae unid. sp.*				x												
POLYCHAETA	*Syllidae unid. sp.*				x	x	x		x	x	x	x	x		x	x	x
POLYCHAETA	*Terebellidae unid. sp.*			1	x					x	x			x	x		x
POLYCHAETA	*Thelepus setosus*	(Quatrefages, 1865)															x
POLYCHAETA	*Trypanosyllis sp.*															x	
		Total Polychaetes	50	11	15	7	9	13	9	11	16	12	9	10	19	7	16
MOLLUSCA	*Anomia nobilis*	Reeve, 1859	I			x						x	x				x
MOLLUSCA	*Aplysiidae unid . sp.*									x							
MOLLUSCA	*Atys debilis*	Pease, 1860						x									
MOLLUSCA	*Balcis spp.*			x													
MOLLUSCA	*Cerithium zebrum*	Kiener, 1841		2													
MOLLUSCA	*Chama cf. fibula*	Reeve, 1846	C	x											x		
MOLLUSCA	*Chama fibula*	Reeve, 1846	C									x	x				
MOLLUSCA	*Chama iostoma*	Conrad, 1837										x			x	x	x
MOLLUSCA	*Chama sp.*				x			x									
MOLLUSCA	*Conus eugrammatus*	Bartsch and Rehder, 1943		x													
MOLLUSCA	*Crassostrea sp.*		I			x				x						x	
MOLLUSCA	*Crassostrea virginica*	(Gmelin, 1971)	I			x											
MOLLUSCA	*Crepidula aculeata*	(Gmelin, 1791)	I					x				x			x		x
MOLLUSCA	*Crucibula spinosum*	(Sowerby, 1824)	I														x
MOLLUSCA	*Ctena bella*	(Conrad, 1837)		x													
MOLLUSCA	*Cuspidaria hawaiensis*	Dall, Bartsch, and Rehder, 1938			x	x					x	x		x	x		x
MOLLUSCA	*Cuspidaria spp.*							x									
MOLLUSCA	*Cymatium sp.*									x							
MOLLUSCA	*Cypraea spp.*																
MOLLUSCA	*Dendostrea sandvicensis*	(Sowerby, 1871)			x			x				x	x		x	x	
MOLLUSCA	*Diodora ?ruppelli*	(Sowerby, 1834)	I	x													
MOLLUSCA	*Diodora octagona*	(Reeve, 1850)		x										x			
MOLLUSCA	*Diodora sp.*												x				

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
MOLLUSCA	*Fissulariidae unid sp.*				x												
MOLLUSCA	*Hiatella arctica*	(Linnaeus, 1767)	I							x							
MOLLUSCA	*Hinemoa indica*	(Melvill, 1896)	I	x													
MOLLUSCA	*Hipponix (Cochlear) imbricatus*	Gould, 1846															
MOLLUSCA	*Hipponix (Pilosabia) pilosus*	(Deshayes, 1832)		x											x		
MOLLUSCA	*Hypselodoris infucata*	(Ruppell and Leuckart, 1828)			x			x	x			x	x	x	x		
MOLLUSCA	*Isognomon californicum*	(Conrad, 1837)								x							
MOLLUSCA	*Isognomon legumen*	(Gmelin, 1791)		x													
MOLLUSCA	*Isognomon perna*	(Linnaeus, 1767)								x							
MOLLUSCA	*Isognomon sp.*			x								x	x				
MOLLUSCA	*Lioconcha fasigata*	Sowerby, 1851	C												x		
MOLLUSCA	*Littoraria scabra*	(Linnaeus, 1758)		x				2		x	x				x	x	
MOLLUSCA	*Mitra (Nebularia) spp.*	Cernohorsky, 1977		x													
MOLLUSCA	*Nerita picea*	(Recluz, 1841)						x									
MOLLUSCA	*Ostrea cf. hanleyana*	Sowerby, 1871									x						
MOLLUSCA	*Ostreidae unid. sp.*						x			x							x
MOLLUSCA	*Ostreidae unid. spp.*					x											
MOLLUSCA	*Petaloconchus keenae*	Hadfield and Kay, 1972														x	x
MOLLUSCA	*Pinctada margaritifera*	(Linnaeus, 1758)															
MOLLUSCA	*Pinctada sp.*																x
MOLLUSCA	*Pusillina marmorata*	Ponder, 1985		x													
MOLLUSCA	*Rissoina cerithiiformis*	Tryon, 1887		x													
MOLLUSCA	*Rochefortina sandwichensis*	Hayami & Kase, 1993		x													
MOLLUSCA	*Salmacina dysteri*	(Huxley, 1855)	I									x					
MOLLUSCA	*Serpulorbis variabilis*	Hadfield and Kay, 1972						x							x		x
MOLLUSCA	*Siphonaria normalis*	Gould, 1846											x				x
MOLLUSCA	*Tambja morosa*	(Bergh, 1877)						x									
MOLLUSCA	*Teredo sp.*						x										
MOLLUSCA	*Vermetidae unid sp.*							x									
MOLLUSCA	*Vermetus alli*	Hadfield & Kay, 1972	I		x			x	x	x	x	x	x		x	x	x
		Total Molluscs	53	x7	6	5	2	x3	2	9	4	x0	8	3	xx	6	xx
PYCNOGONIDA	*Pycnogonida unid. sp.*			x				x		x		x				x	
CRUSTACEA	*Apseudes sp. 1*																x
CRUSTACEA	*Amphipoda unid. sp.*													x			x
CRUSTACEA	*Balanus amphitrite*	Darwin 1854	I							x				x			
CRUSTACEA	*Balanus eburneus*	Gould, 1841	I			x	x			x	x			x			
CRUSTACEA	*Balanus reticulatus*	Utinomi, 1967	I			x				x	x	x	x	x		x	

Taxa	Scientific name	Author_Date	Orig	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
CRUSTACEA	*Balanus sp.*		I		x										x		
CRUSTACEA	*Caprellidae unid. sp.*															x	
CRUSTACEA	*Chthamalus proteus*	Dando & Southward, 1980	I		x	x	x	x		x	x	x	x	x	x	x	
CRUSTACEA	*Colomastix kapiolani*	Barnard, 1970														x	
CRUSTACEA	*Colomastix lunalilo*	Barnard, 1970							x		x			x		x	x
CRUSTACEA	*Colomastix pusilla*	Grube, 1864									x						
CRUSTACEA	*Corophium baconi*	Shoemaker, 1934	I								x			x		x	
CRUSTACEA	*Corophium sp.*		I														x
CRUSTACEA	*Crab Larvae unid. Sp.*				x					x							
CRUSTACEA	*Elasmopus sp.*										x					x	
CRUSTACEA	*Ericthonius brasiliensis*	(Dana, 1853)	I								x					x	
CRUSTACEA	*Ericthonius sp.*						x					x					
CRUSTACEA	*Gonodactylaceus falcatus*	(Forskal, 1775)	I						x								
CRUSTACEA	*Grandidierella sp*											x					
CRUSTACEA	*Hyastenus tenuicornis*	(Pocock , 1895)															
CRUSTACEA	*Lembos sp.*																
CRUSTACEA	*Leptochelia dubia*	Krøyer, 1842	C						x					x			x
CRUSTACEA	*Leucothoe hyhelia*	Barnard, 1965							x		x			x		x	x
CRUSTACEA	*Leucothoe sp.1*																
CRUSTACEA	*Lysianassa ewa*	Barnard, 1970									x						
CRUSTACEA	*Maera pacifica*	Schellenberg, 1938									x			x		x	
CRUSTACEA	*Maera sp.*								x								
CRUSTACEA	*Metopograpsus messor*	(Forskal, 1775)									x					x	x
CRUSTACEA	*Metopograpsus thukuhar*	(Owen, 1893)								x					x		
CRUSTACEA	*Monocorophium ascherusicum*	(Costa, 1853)	I				x										
CRUSTACEA	*Pachygrapsus sp.*															x	
CRUSTACEA	*Pachynidae unid. sp.*																x
CRUSTACEA	*Panopeus lacustris*	Desbonne, 1867	I								x						
CRUSTACEA	*Panopeus pacificus*	Edmondson, 1931	I			x											
CRUSTACEA	*Parasterope sp*									x							
CRUSTACEA	*Paravargula sp.*										x			x			x
CRUSTACEA	*Parthenope sp.*													x			
CRUSTACEA	*Photis hawaiensis*	Barnard, 1955	C								x			x		x	
CRUSTACEA	*Phymodius nitidus*	(Dana, 1852)							x		x						
CRUSTACEA	*Phymodius sp.*															x	
CRUSTACEA	*Pilumnus ?taeniola*	Rathbun, 1906		x													
CRUSTACEA	*Pilumnus oahuensis*	Edmondson, 1931	I	x	x			x	x	x	x	x	x	x	x	x	
CRUSTACEA	*Pilumnus vespertilio*	(Fabricus, 1793)															
CRUSTACEA	*Podocerus brasiliensis*	Dana, 1853	I													x	

Taxa	Scientific name	Author_Date	Orig	x	2	4A	5A	6A	7	8	9A	x0A	xx	x2	x3	x4	x5
CRUSTACEA	*Stenopus hispidus*	(Olivier, 1811)		x													
CRUSTACEA	*Stenothoidae unid. spp.*															x	
CRUSTACEA	*Synalpheus streptodactylus*	Coutiere, 1905							x								
CRUSTACEA	*Synalpheus thai*	Banner & Banner, 1966							x								
CRUSTACEA	*Thalamita dakini*	Montgomerey, 1931						x			x			x			
CRUSTACEA	*Thalamita integra*	Dana, 1852				x											
CRUSTACEA	*Thalamita sp.*												x		x	x	
		Total Crustaceans	50	3	4	5	4	3	9	8	18	5	4	15	5	18	
BRYOZOA	*Amathia distans*	Busk, 1886	I		x					x		x	x	x			x
BRYOZOA	*Bugula dentata*	(Lamauroux, 1816)	I					x					x	x			
BRYOZOA	*Bugula neritina*	(Linnaeus, 1758)	I	x						x	x	x			x		
BRYOZOA	*Celleporaria sp.*			x				x									x
BRYOZOA	*Diaperoforma sp.*			x				x					x		x		
BRYOZOA	*Ectoprocta unid. sp.*																x
BRYOZOA	*Schizoporella cf. errata*	(Waters, 1878)	I	x	x			x	x	x	x	x	x	x	x		x
BRYOZOA	*Watersipora edmondsoni*	Soule and Soule, 1968	I					x									
BRYOZOA	*Zoobotryon verticillatum*	(delle Chiaje, 1828)	I		x						x		x				
		Total Bryozoans	9	4	3	0	0	5	1	3	3	3	5	3	3	0	4
ECHINODERMS	*Echinometra mathaei*	(Blainville, 1825)		x													
ECHINODERMS	*Echinothrix calamaris*	(Pallas, 1774)		x													
ECHINODERMS	*Echinothrix diadema*	(Linnaeus, 1758)		x													
ECHINODERMS	*Eucidaris metularia*	Lamarck, 1816		x													
ECHINODERMS	*Heterocentrotus mammillatus*	(Linnaeus, 1758)															
ECHINODERMS	*Holothuria (Lessonothuria) pardalis*	Selenka, 1867		x													
ECHINODERMS	*Holothuria (Thymiosycia) impatiens*	(Forskal, 1775)															
ECHINODERMS	*Holothuria unid. sp.*			x	x												
ECHINODERMS	*Labidodemas semperianum*	Selenka, 1867		x													
ECHINODERMS	*Opheodesoma spectabilis*	Fisher, 1907							x					x	x		
ECHINODERMS	*Ophiactis savignyi*	(Muller and Troschel, 1842)	C	x	x			x	x	x	x	x	x	x	x	x	x
ECHINODERMS	*Ophiocoma erinaceus*	Muller and Troschel, 1842		x													
ECHINODERMS	*Polyplectana kefersteinii*	(Selenka, 1867)		x													
ECHINODERMS	*Tripneustes gratilla*	(Linnaeus, 1758)		x													
		Total Echinoderms	14	11	2	0	0	1	2	1	1	1	1	2	2	1	1
ASCIDACEA	*?Polyclinum sp.*																
ASCIDACEA	*Ascidia sp. A*		I						x								

Taxa	Scientific name	Author_Date	Orig	x	2	4A	5A	6A	7	8	9A	x0A	xx	x2	x3	x4	x5
ASCIDACEA	*Ascidia sp. B*		I	x	x			x				x				x	
ASCIDACEA	*Ascidia spp.*														x		
ASCIDACEA	*Ascidia sydneiensis*	Stimpson, 1855	I					x	x		x			x	x		x
ASCIDACEA	*Botrylloides sp.*										x						
ASCIDACEA	*Cnemidocarpa irene*	(Hartmeyer, 1906)	I												x	x	
ASCIDACEA	*Didemnum cf. candidum*	Savigny, 1816	I					x		x	x	x	x	x	x	x	x
ASCIDACEA	*Didemnum edmondsoni*	Eldredge, 1967								x							
ASCIDACEA	*Didemnum perlucidum*	Monniot, 1983	I						x								
ASCIDACEA	*Didemnum sp.*	Savigny, 1816	I		x												
ASCIDACEA	*Diplosoma cf. spongiforme*	(Giard, 1872)	I								x	x					
ASCIDACEA	*Diplosoma listerianum*	(Milne Edwards, 1841)	I									x					
ASCIDACEA	*Herdmania mauritiana*	(Drasche, 1884)	I		x										x	x	
ASCIDACEA	*Herdmania pallida*	(Savigny, 1816)	I	x	x			x	x			x					
ASCIDACEA	*Herdmania sp.*				x												
ASCIDACEA	*Microcosmus exasperatus*	Heller, 1878	I					x		x					x		
ASCIDACEA	*Phallusia nigra*	Savigny, 1816	I	x				x	x		x	x	x	x	x		x
ASCIDACEA	*Polyandrocarpa sagamiensis*	Tokioka, 1953	I					x				x		x			
ASCIDACEA	*Polyandrocarpa zooritensis*	Van Name, 1931	I								x						
ASCIDACEA	*Polycarpa aurita*	(Sluiter, 1890)											x			x	
ASCIDACEA	*Polycarpa cryptocarpa*	(Sluiter, 1885)	C										x			x	
ASCIDACEA	*Polycarpa sp.*			x													
ASCIDACEA	*Styela canopus*	Savigny, 1816	I								x						x
ASCIDACEA	*Symplegma sp.*											x					
		Total Ascidians	25	4	5	0	0	8	5	3	7	8	4	4	7	6	4
Osteichthyes	*Abudefduf abdominalis*	(Quoy and Gaimard, 1824)							x	x			x		x	x	
Osteichthyes	*Acanthurus ?dussumieri*	Valenciennes 1835											x				
Osteichthyes	*Acanthurus blochii*	Valenciennes 1835		x				x		x					x	x	
Osteichthyes	*Acanthurus dussumieri*	Valenciennes 1835								x		x					
Osteichthyes	*Acanthurus leucopareius*	(Jenkins, 1903)													x		
Osteichthyes	*Acanthurus triostegus*	(Linnaeus, 1758)		x					x	x							
Osteichthyes	*Arothron hispidus*	(Linneaus, 1758)			x			x	x	x					x	x	x
Osteichthyes	*Blennidae unid. species*									x							
Osteichthyes	*Canthigaster jactator*	(Jenkins, 1901)		x													
Osteichthyes	*Chaetodon auriga*	Forsskål 1775			x				x								
Osteichthyes	*Chromis vanderbilti*	(Fowler, 1941)															
Osteichthyes	*Dascyllus albisella*	Gill 1862			x				x	x							
Osteichthyes	*Diodon hystrix*	Linnaeus 1758		x													
Osteichthyes	*Gnathanodon speciosus*	(Forsskål, 1775)											x				

Taxa	Scientific name	Author_Date	Orig	x	2	4A	5A	6A	7	8	9A	x0A	xx	x2	x3	x4	x5
Osteichthyes	*Kuhlia sandvicensis*	(Steindachner, 1876)								x							
Osteichthyes	*Labroides phthirophagus*	Randall 1958		x	x												
Osteichthyes	*Lutjanus fulvus*	(Forster in Bloch and Schneider, 1801)	I						x						x	x	
Osteichthyes	*Naso unicornis*	(Forsskål, 1775)							x								
Osteichthyes	*Ostracion meleagris*	(Shaw and Nodder, 1796)		x				x									
Osteichthyes	*Parupeneus multifasciatus*	(Quoy and Gaimard, 1825)							x								
Osteichthyes	*Scarus sp. juv.*			x											x		
Osteichthyes	*Stethojulis balteata*	(Quoy and Gaimard, 1824)							x								
Osteichthyes	*Thalassoma duperrey*	(Quoy and Gaimard, 1824)		x													
Osteichthyes	*Zebrasoma flavescens*	(Bennett, 1828)							x								
		Total Fish	24	8	4	0	0	3	10	8	0	1	3	0	6	4	1
		Total Taxa	298	79	58	26	21	66	57	57	57	57	48	49	67	59	55
		Cryptogenic	27	6	7	2	2	7	6	5	6	9	7	6	7	7	7
		Introduced	69	17	20	15	8	24	17	20	24	25	20	23	20	22	17
		Intr+Crypto	96	23	27	17	10	31	23	25	30	34	27	29	27	29	24
		% NIS	32.2	29.1	46.6	65.4	47.6	47.0	40.4	43.9	52.6	59.6	56.3	59.2	40.3	49.2	43.6

APPENDIX B

Introduced or Cryptogenic Species Collected in Pearl Harbor in 2007-2008

Taxa	Scientific name	Origin	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
PORIFERA	*Biemna fistulosa*	Cryptogenic	x	x			x	x	x		x	x	x	x		
PORIFERA	*Ciocalypta sp.*	Cryptogenic			x											
PORIFERA	*Cladocroce burapha*	Cryptogenic					x		x		x		x		x	x
PORIFERA	*Iotrochota purpurea*	Cryptogenic	x													
PORIFERA	*Lissodendoryx similis*	Cryptogenic													x	
PORIFERA	*Monanchora clathrata*	Cryptogenic	x				x							x		
PORIFERA	*Mycale phyllophila*	Cryptogenic		x												
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Cryptogenic									x	x				
PORIFERA	*Tedania (Tedania) ignis*	Cryptogenic		x				x	x		x		x		x	x
PORIFERA	*Topsentia halichondrioides*	Cryptogenic	x				x	x				x				
CNIDARIA	*Clytia cf. gracilis*	Cryptogenic		x			x									x
CNIDARIA	*Clytia latitheca*	Cryptogenic									x					
CNIDARIA	*Corydendrium parasiticum*	Cryptogenic									x	x				
POLYCHAETA	*Amphiglena mediterranea*	Cryptogenic								x						
POLYCHAETA	*Amphiglena sp.*	Cryptogenic				x				x						
POLYCHAETA	*Branchiomma nigromaculata*	Cryptogenic						x		x				x		x
POLYCHAETA	*Chaetopterus sp.*	Cryptogenic					x			x				x	x	
POLYCHAETA	*Serpula vermicularis*	Cryptogenic			x	x			x		x					x
POLYCHAETA	*Simplicaria pseudomilitaris*	Cryptogenic		x												
POLYCHAETA	*Spinther japonicus*	Cryptogenic		x												
MOLLUSCA	*Chama cf. fibula*	Cryptogenic	x											x		
MOLLUSCA	*Chama fibula*	Cryptogenic									x	x				
MOLLUSCA	*Lioconcha fasigata*	Cryptogenic												x		
CRUSTACEA	*Leptochelia dubia*	Cryptogenic						x					x			x
CRUSTACEA	*Photis hawaiensis*	Cryptogenic								x			x		x	
ECHINODERMATA	*Ophiactis savignyi*	Cryptogenic	x	x			x	x	x	x	x	x	x	x	x	x
ASCIDACEA	*Polycarpa cryptocarpa*	Cryptogenic										x			x	
Rhodophyta	*Acanthophora spicifera*	Introduced			x	x		x	x	x			x		x	
RHODOPHYTA	*Gracilaria salicornia*	Introduced	x	x	x			x				x				
RHIZOPHORACEAE	*Rhizophora mangle*	Introduced		x	x	x			x	x					x	x
PORIFERA	*Dysidea arenaria*	Introduced	x	x			x	x	x		x		x	x	x	
PORIFERA	*Gelliodes fibrosa*	Introduced					x				x		x			
PORIFERA	*Haliclona (Soestella) coerulea*	Introduced	x	x			x	x	x	x	x	x	2	x	x	x
PORIFERA	*Mycale (Carmia) cecilia*	Introduced							x						x	
PORIFERA	*Mycale (Mycale) grandis*	Introduced	x	x	x		x	x	x	x	x	x	x	x	x	
PORIFERA	*Mycale (Zygomycale) parishi*	Introduced					x									
PORIFERA	*Suberites aurantiacus*	Introduced			x			x		x	x	x	x		x	x
CNIDARIA	*Carijoa cf. riisei*	Introduced	x				x					x	x			

Taxa	Scientific name	Origin	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
CNIDARIA	*Obelia dichotoma*	Introduced													x	x
CNIDARIA	*Pennaria disticha*	Introduced	x	x			x				x	x			x	
POLYCHAETA	*Hydroides brachyacantha*	Introduced			x	x										
POLYCHAETA	*Hydroides crucigera*	Introduced			x											
POLYCHAETA	*Hydroides dirampha*	Introduced			x	x				x						
POLYCHAETA	*Hydroides elegans*	Introduced	x	x		x				x	x	x	x	x		x
POLYCHAETA	*Pileolaria militaris*	Introduced		x												
POLYCHAETA	*Pomatoleios kraussii*	Introduced			x	x										
POLYCHAETA	*Sabellastarte spectabilis*	Introduced	x				x	x	x	x	x	x	x	x	x	x
POLYCHAETA	*Salmacina dysteri*	Introduced	x	x			x	x	x			x	x	x		
MOLLUSCA	*Anomia nobilis*	Introduced			x						x	x				x
MOLLUSCA	*Crassostrea sp.*	Introduced			x				x						x	
MOLLUSCA	*Crassostrea virginica*	Introduced			x											
MOLLUSCA	*Crepidula aculeata*	Introduced					x				x			x		x
MOLLUSCA	*Crucibula spinosum*	Introduced														x
MOLLUSCA	*Diodora ?ruppelli*	Introduced	x													
MOLLUSCA	*Hiatella arctica*	Introduced							x							
MOLLUSCA	*Hinemoa indica*	Introduced	x													
MOLLUSCA	*Salmacina dysteri*	Introduced									x					
MOLLUSCA	*Vermetus alli*	Introduced		x			x	x	x	x	x	x		x	x	x
CRUSTACEA	*Balanus amphitrite*	Introduced							x				x			
CRUSTACEA	*Balanus eburneus*	Introduced			x	x			x	x			x			
CRUSTACEA	*Balanus reticulatus*	Introduced			x				x	x	x	x	x		x	
CRUSTACEA	*Balanus sp.*	Introduced		x										x		
CRUSTACEA	*Chthamalus proteus*	Introduced		x	x	x	x		x	x	x	x	x	x	x	
CRUSTACEA	*Corophium baconi*	Introduced								x			x		x	
CRUSTACEA	*Corophium sp.*	Introduced														x
CRUSTACEA	*Ericthonius brasiliensis*	Introduced								x					x	
CRUSTACEA	*Gonodactylaceus falcatus*	Introduced						x								
CRUSTACEA	*Monocorophium ascherusicum*	Introduced				x										
CRUSTACEA	*Panopeus lacustris*	Introduced								x						
CRUSTACEA	*Panopeus pacificus*	Introduced			x											
CRUSTACEA	*Pilumnus oahuensis*	Introduced	x	x			x	x	x	x	x	x	x	x	x	
CRUSTACEA	*Podocerus brasiliensis*	Introduced													x	
BRYOZOA	*Amathia distans*	Introduced		x					x		x	x	x			x
BRYOZOA	*Bugula dentata*	Introduced					x					x	x			
BRYOZOA	*Bugula neritina*	Introduced	x						x	x	x			x		
BRYOZOA	*Schizoporella cf. errata*	Introduced	x	x			x	x	x	x	x	x	x	x		x

Taxa	Scientific name	Origin	1	2	4A	5A	6A	7	8	9A	10A	11	12	13	14	15
BRYOZOA	*Watersipora edmondsoni*	Introduced					x									
BRYOZOA	*Zoobotryon verticillatum*	Introduced		x						x		x				
ASCIDACEA	*Ascidia sp. A*	Introduced						x								
ASCIDACEA	*Ascidia sp. B*	Introduced	x	x			x				x				x	
ASCIDACEA	*Ascidia sydneiensis*	Introduced					2	x		x			x	x		x
ASCIDACEA	*Cnemidocarpa irene*	Introduced												x	x	
ASCIDACEA	*Didemnum cf. candidum*	Introduced					x		x	x	x	x	x	x	x	x
ASCIDACEA	*Didemnum perlucidum*	Introduced						x								
ASCIDACEA	*Didemnum sp.*	Introduced		x												
ASCIDACEA	*Diplosoma cf. spongiforme*	Introduced								x	x					
ASCIDACEA	*Diplosoma listerianum*	Introduced									x					
ASCIDACEA	*Herdmania mauritiana*	Introduced		x										x	x	
ASCIDACEA	*Herdmania pallida*	Introduced	x	x			x	x			x					
ASCIDACEA	*Microcosmus exasperatus*	Introduced					x		x					x		
ASCIDACEA	*Phallusia nigra*	Introduced	x				x	x		x	x	x	x	x		x
ASCIDACEA	*Polyandrocarpa sagamiensis*	Introduced					x				x		x			
ASCIDACEA	*Polyandrocarpa zooritensis*	Introduced								x						
ASCIDACEA	*Styela canopus*	Introduced								x						x
Osteichthyes	*Lutjanus fulvus*	Introduced						x						x	x	
	Total Taxa	298	79	58	26	21	66	57	57	57	57	48	49	67	59	55
	Cryptogenic	27	6	7	2	2	7	6	5	6	9	7	6	7	7	7
	Introduced	68	17	20	15	8	24	17	20	24	25	20	23	20	22	17
	Intr+Crypto	95	23	27	17	10	31	23	25	30	34	27	29	27	29	24
	% NIS	32.2	29.1	46.6	65.4	47.6	47.0	40.4	43.9	52.6	59.6	56.3	59.2	40.3	49.2	43.6

APPENDIX C

Genera and Species not Previously Reported in Pearl Harbor

Taxa	Scientific name	1	2	4A	6A	6A	7	8	09A	10A	PH11	12A	13	14	15
PORIFERA	*Ciocalypta sp.*			x											
PORIFERA	*Cladocroce burapha*					x		x		x		x		x	x
PORIFERA	*Hamigera cf. sp.*						x								
PORIFERA	*Iotrochota purpurea*	x													
PORIFERA	*Iotrochota sp.*		x				x		x		x		x		
PORIFERA	*Leucetta solida*	x													
PORIFERA	*Lissodendoryx similis*													x	
PORIFERA	*Monanchora clathrata*	x				x							x		
PORIFERA	*Petrosia sp.*	x													
PORIFERA	*Pseudosuberites sp.*													x	
PORIFERA	*Raspailia (Clathriodendron) darwinensis*									x	x				
PORIFERA	*Strongylacidon kaneohe*							x							
Total Porifera	*12*	4	1	1	0	2	2	2	1	2	2	1	2	3	1
CNIDARIA	*Clytia cf. gracilis*		x			x									x
CNIDARIA	*Clytia latitheca*									x					
CNIDARIA	*Corydendrium parasiticum*									x	x				
CNIDARIA	*Montipora capitata*	x													
CNIDARIA	*Porites lobata*														
CNIDARIA	*Protopalythoa sp.*		x			x									
CNIDARIA	*Zoanthus sp. (white)*		x				x								
Total Cnidaria	*7*	1	3	0	0	2	1	0	0	2	1	0	0	0	1
SIPUNCULA	*Phascolosoma stephensoni*						x								
POLYCHAETA	*Amphiglena mediterranea*								x						
POLYCHAETA	*Amphiglena sp.*				x				x						
POLYCHAETA	*Hydroides brachyacantha*			x	x										
POLYCHAETA	*Loimia medusa*						x					x			
POLYCHAETA	*Lumbrineris dentata*												x		
POLYCHAETA	*Marphysa corallina*												x		
POLYCHAETA	*Perinereis curvata*														
POLYCHAETA	*Pileolaria militaris*		x												
POLYCHAETA	*Potamethus sp.*								x						
POLYCHAETA	*Sabellastarte indica*						x						x		
POLYCHAETA	*Schistomeringos sp.*													x	
POLYCHAETA	*Serpulorbis variabilis*					x							x		x
Total Polychaeta	*12*	0	1	1	2	1	2	0	3	0	0	1	4	1	1

Taxa	Scientific name	1	2	4A	6A	6A	7	8	09A	10A	PH11	12A	13	14	15
MOLLUSCA	*Atys debilis*					x									
MOLLUSCA	*Cerithium zebrum*	x													
MOLLUSCA	*Conus eugrammatus*	x													
MOLLUSCA	*Cuspidaria hawaiensis*		x	x					x	x		x	x		x
MOLLUSCA	*Diodora octagona*	x										x			
MOLLUSCA	*Isognomon californicum*							x							
MOLLUSCA	*Lioconcha fasigata*												x		
MOLLUSCA	*Petaloconchus keenae*													x	x
MOLLUSCA	*Pusillina marmorata*	x													
MOLLUSCA	*Rissoina cerithiiformis*	x													
MOLLUSCA	*Rochefortina sandwichensis*	x													
MOLLUSCA	*Tambja morosa*					x									
Total Molluscs	*12*	7	1	1	0	2	0	1	1	1	0	2	2	1	2
CRUSTACEA	*Colomastix kapiolani*													x	
CRUSTACEA	*Hyastenus tenuicornis*														
CRUSTACEA	*Lysianassa ewa*								x						
CRUSTACEA	*Metopograpsus messor*								x					x	x
CRUSTACEA	*Pachygrapsus sp.*													x	
CRUSTACEA	*Panopeus lacustris*								x						
CRUSTACEA	*Paravargula sp.*								x			x			x
CRUSTACEA	*Pilumnus ?taeniola*	x													
CRUSTACEA	*Thalamita dakini*					x			x			x			
Total Crustacea	*9*	1	0	0	0	1	0	0	5	0	0	2	0	3	2
BRYOZOA	*Diaperoforma sp.*	x				x					x		x		
BRYOZOA	*Zoobotryon verticillatum*		x						x		x				
Total Bryozoa	2	1	1	0	0	1	0	0	1	0	2	0	1	0	0
ECHINODERMS	*Echinothrix calamaris*	x													
ECHINODERMS	*Echinothrix diadema*	x													
ECHINODERMS	*Holothuria (Lessonothuria) pardalis*	x													
ECHINODERMS	*Labidodemas semperianum*	x													
ECHINODERMS	*Ophiocoma erinaceus*	x													
ECHINODERMS	*Polyplectana kefersteinii*	x													
Total Echinoderms	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
ASCIDACEA	*?Polyclinum sp.*														
ASCIDACEA	*Ascidia sp. A*						x								
ASCIDACEA	*Cnemidocarpa irene*												x	x	
ASCIDACEA	*Didemnum perlucidum*						x								

Taxa	*Scientific name*	x	2	4A	6A	6A	7	8	09A	x0A	PHxx	x2A	x3	x4	x5
ASCIDACEA	*Diplosoma cf. spongiforme*								1	1					
ASCIDACEA	*Herdmania mauritiana*		x										x	x	
ASCIDACEA	*Polyandrocarpa sagamiensis*					x				x		x			
ASCIDACEA	*Polyandrocarpa zooritensis*								x						
ASCIDACEA	*Polycarpa aurita*										x			x	
ASCIDACEA	*Polycarpa cryptocarpa*										x			x	
ASCIDACEA	*Polycarpa sp.*	x													
ASCIDACEA	*Styela canopus*								x						x
Total Ascidacea	*12*	1	1	0	0	1	2	0	3	2	2	1	2	4	1
Osteichthyes	*Acanthurus leucopareius*												x		
Total Fish	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		1	2	4A	5A	6A	7	8	9A	10A	11	12A	13	14	15
Total Taxa	298	79	58	26	18	65	57	57	57	57	48	49	67	59	55
New Genera or Species	75	21	8	3	2	11	7	3	14	7	7	7	12	12	9
% New PH Reports	25.2%	26.6%	13.8%	11.5%	11.1%	16.9%	12.3%	5.3%	24.6%	12.3%	14.6%	14.3%	17.9%	20.3%	16.4%

APPENDIX D

Station Records for Organisms Collected or Observed in Honolulu Harbor or Ke‘ehi lagoon in 2008

Taxa	*Scientific name*	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19	KL20
Chlorophyta	*Acanthophora spicifera*	(Vahl)	Introduced			x			
Chlorophyta	*Dictyosphaeria versluysii*	Weber Bosse	Native	x	x				
Chlorophyta	*Dictyota sp.*		Native		x				
Chlorophyta	*Neomeris sp.*		Native		x				
Chlorophyta	*Padina sp.*		Native		x			x	
Chlorophyta	*Ulva lactuca*	Linn.	Native			x			
Rhodophyta	*Amansia glomerata*	C.Agardh	Native		x				
Rhodophyta	*Gracilaria salicornia*	(C. Agardh) Dawson	Introduced					x	
Rhodophyta	*Hypnea sp.*		Native			x			
		Total Algae	9	1	5	3	0	2	0
Rhizophoraceae	*Rhizophora mangle*	Linnaeus, 1758	Introduced					x	x
CILIOPHORA	*Foraminifera unid. sp*		Native	x					
PORIFERA	*?Haliclona (Soestella) coerulea*	Hechtel, 1965	Introduced		x		x		
PORIFERA	*?Stylinos sp.*		Native	x		x			
PORIFERA	*?Tedania sp.*		Cryptogenic			x			
PORIFERA	*Biemna fistulosa*	(Topsent, 1897)	Cryptogenic	x	x	x		x	
PORIFERA	*Chelonaplysilla violacea*	(Lendenfeld, 1883)	Native						
PORIFERA	*Dysidea arenaria*	(Schmidt, 1862)	Introduced		x		x	x	
PORIFERA	*Haliclona (Soestella) coerulea*	(Hechtel, 1965)	Introduced	x				x	
PORIFERA	*Iotrochota baculifera*	Ridley, 1884	Cryptogenic		x				
PORIFERA	*Iotrochota purpurea*	(Bowerbank, 1875)	Cryptogenic	x	x				
PORIFERA	*Iotrochota sp.*		Native			x			
PORIFERA	*Monanchora dianchora*	de Laubenfels, 1935	Cryptogenic	x	x			x	
PORIFERA	*Mycale (Mycale) grandis*	Gray, 1867	Introduced		x			x	
PORIFERA	*Mycale (Zygomycale) parishi*	(Bowerbank, 1875)	Introduced				x	x	
PORIFERA	*Raspailia (Clathriodendron) ?darwinensis*	Hooper, 1991	Cryptogenic	x					
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Hooper, 1991	Cryptogenic		x				
PORIFERA	*Raspailia (Clathriodendron) sp.*		Cryptogenic	x	x				
PORIFERA	*Scopalina sp.*		Cryptogenic	x					
PORIFERA	*Suberites aurantiacus*	(Duchassaing & Michelotti, 1864)	Introduced				x		
PORIFERA	*Tedania (Tedania) ignis*	(Duchassaing & Michelotti, 1864)	Cryptogenic	x				x	
PORIFERA	*Tedania sp.*		Cryptogenic		x				
		Total Sponges	20	9	10	4	4	7	0
CNIDARIA	*Bougainvillidae unid sp.*		Native		x				
CNIDARIA	*Clytia cf. gracilis*	(M. Sars, 1850)	Cryptogenic				x		
CNIDARIA	*Cyphastrea ocellina*	(Dana, 1846)	Native	x					
CNIDARIA	*Halecium sp.*		Native		x		x	x	x
CNIDARIA	*Halopteris plagiocampa*	(Pictet, 1893)	Cryptogenic	x		x			
CNIDARIA	*Hydrozoa unid. sp.*		Native	x					
CNIDARIA	*Leptastrea purpurea*	Dana, 1846	Native	x	x			x	
CNIDARIA	*Montipora capitata*	(Dana, 1846)	Native	x	x	x			
CNIDARIA	*Montipora patula*	Verrill, 1864	Native	x	x	2			
CNIDARIA	*Obelia bidentata*	Clarke, 1875	Introduced						x
CNIDARIA	*Pavona varians*	Verrill, 1864	Native		x	x			
CNIDARIA	*Pennaria disticha*	(Goldfuss, 1820)	Introduced	x			x	x	
CNIDARIA	*Pocillopora damicornis*	(Linnaeus, 1758)	Native	x	x	x			
CNIDARIA	*Pocillopora meandrina*	Dana, 1846	Native	x		x			

Taxa	*Scientific name*	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19	KL20
CNIDARIA	*Porites compressa*	Dana, 1846	Native	x	x	x			
CNIDARIA	*Porites evermanni*	Vaughan, 1907	Native	x	x	x			
CNIDARIA	*Porites lobata*	Dana, 1846	Native	x	x				
CNIDARIA	*Ventromma halecioides*	(Alder, 1859)	Cryptogenic				1		
		Total Cnidarians	18	12	10	9	4	3	2
SIPUNCULA	*Sipuncula unid. sp.*		Native		x	x			
ANNELIDA	*?Demonax sp.*		Native	x					
ANNELIDA	*Amphiglena sp.*		Cryptogenic		x				
ANNELIDA	*Branchiomma nigromaculata*	(Baird, 1865)	Cryptogenic	x	x		x		
ANNELIDA	*Branchiomma sp.*		Native			x			
ANNELIDA	*Cerratulidae unid. sp.*		Native	x					
ANNELIDA	*Cirratulidae unid. sp.*		Native					x	
ANNELIDA	*Dorvilleidae unid. sp.*		Native	x					
ANNELIDA	*Eunice antennata*	(Savigny, 1820)	Native		x				
ANNELIDA	*Eunicidae unid. sp.*		Native	x		x	x	x	
ANNELIDA	*Glyceridae unid. sp.*		Native	x					
ANNELIDA	*Hydroides sp.*		Native			x			
ANNELIDA	*Lepidonototus sp.*		Native				x		
ANNELIDA	*Loimia medusa*	(Savigny, 1818)	Native	x					
ANNELIDA	*Lumbrineridae unid. sp.*		Native					x	
ANNELIDA	*Marphysa sp.*		Native		x				
ANNELIDA	*Nematonereis unicornis*	Schmarda, 1861	Native		x		x	x	
ANNELIDA	*Nereididae unid. sp.*		Native	x	x				
ANNELIDA	*Oenone fulgida*	Savigny, 1818	Cryptogenic					x	
ANNELIDA	*Perinereis curvata*	Holly, 1935	Native		x				
ANNELIDA	*Phyllodocidae unid. sp.*		Native	x			x		
ANNELIDA	*Polynoidae unid. sp.*		Native	x				x	
ANNELIDA	*Pomatoleios kraussii*	Baird, 1865	Introduced				x		
ANNELIDA	*Sabellastarte spectabilis*	(Grube, 1878)	Introduced	x	x	x	x	x	
ANNELIDA	*Sabellidae unid. sp.*		Native	x	x		x	x	
ANNELIDA	*Salmacina dysteri*	(Huxley, 1855)	Introduced	x			x		
ANNELIDA	*Spionidae unid. sp.*		Native	x					
ANNELIDA	*Spirobranchus giganteus*	(Grube, 1862)	Native	x		x			
ANNELIDA	*Sylidae unid. sp.*		Native	x					
ANNELIDA	*Syllidae unid. sp.*		Native		x	x	x	x	
ANNELIDA	*Terebellidae unid. sp.*		Native	x				x	
		Total Polychaetes	30	17	10	6	10	10	0
MOLLUSCA	*Brachidontes crebristriatus*	(Conrad, 1837)	Native				x		
MOLLUSCA	*Chama iostoma*	Conrad, 1837	Native					x	
MOLLUSCA	*Conus miles*	Linnaeus, 1758	Native	x					
MOLLUSCA	*Crassostrea sp.*		Introduced		x	x	x		x
MOLLUSCA	*Cymatium sp.*		Native			x			
MOLLUSCA	*Cypraea isabella*	Linnaeus, 1758	Native		x	x			
MOLLUSCA	*Cypraea spp.*		Native			x			
MOLLUSCA	*Dendostrea sandvicensis*	(Sowerby, 1871)	Native		x	x	x		
MOLLUSCA	*Hipponix (Cochlear) imbricatus*	Gould, 1846	Native			x			
MOLLUSCA	*Hypselodoris infucata*	(Ruppell and Leuckart, 1828)	Native					x	
MOLLUSCA	*Isognomon perna*	(Linnaeus, 1767)	Native			x			
MOLLUSCA	*Isognomon sp.*		Native	x					
MOLLUSCA	*Littoraria pintado*	(Wood, 1828)	Native			x			

Taxa	*Scientific name*	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19	KL20
MOLLUSCA	*Littoraria scabra*	(Linnaeus, 1758)	Native			x			
MOLLUSCA	*Mollusca unid. spp.*		Native					x	
MOLLUSCA	*Nodilittorina hawaiensis*		Native			x			
MOLLUSCA	*Ostreidae unid. sp.*		Native						x
MOLLUSCA	*Pinctada margaritifera*	(Linnaeus, 1758)	Native	x					
MOLLUSCA	*Tambja morosa*	(Bergh, 1877)	Native	x					
MOLLUSCA	*Thaididae unid. sp.*		Native			x			
MOLLUSCA	*Vermetidae unid. spp.*		Native			x			
MOLLUSCA	*Vermetus alli*	Hadfield & Kay, 1972	Introduced					x	
MOLLUSCA	*Zafra cf. hervieri*	(Pace, 1903),	Cryptogenic			x			
		Total Molluscs	23	4	3	13	3	4	2
PYCNOGONIDA	*Pycnogonida unid. sp.*		Native			x			
CRUSTACEA	*Ampithoe sp.*	Barnard, 1970	Native				x		
CRUSTACEA	*Ampithoe waialua*	Barnard, 1970	Native	x					
CRUSTACEA	*Anatanais insularis*	Miller, 1940	Native		x		x		
CRUSTACEA	*Balanus amphitrite*	Darwin 1854	Introduced						x
CRUSTACEA	*Balanus eburneus*	Gould, 1841	Introduced						x
CRUSTACEA	*Balanus reticulatus*	Utinomi, 1967	Introduced				x		x
CRUSTACEA	*Balanus sp.*		Introduced						x
CRUSTACEA	*Bemlos macromanus*	Shoemaker, 1925	Native			x			
CRUSTACEA	*Chthamalus proteus*	Dando & Southward, 1980	Introduced			x			x
CRUSTACEA	*Colomastix kapiolani*	Barnard, 1970	Native		x		x		
CRUSTACEA	*Colomastix lunalilo*	Barnard, 1970	Native	x			x	x	x
CRUSTACEA	*Colomastix pusilla*	Grube, 1864	Native					x	
CRUSTACEA	*Corophium sp.*		Introduced						x
CRUSTACEA	*Ericthonius brasiliensis*	(Dana, 1853)	Introduced					x	
CRUSTACEA	*Glabropilumnus seminudus*	(Miers,)	Introduced	x					
CRUSTACEA	*Grapsus tenuicrustatus*	(Herbst, 1783)	Native			x			
CRUSTACEA	*Hyastenus tenuicornis*	(Pocock , 1895)	Native					x	
CRUSTACEA	*Lembos sp.*		Native	x					
CRUSTACEA	*Leptochelia dubia*	Krøyer, 1842	Cryptogenic	x	x	x	x	x	
CRUSTACEA	*Leucothoe hyhelia*	Barnard, 1965	Native		x	x	x	x	x
CRUSTACEA	*Leucothoe sp.1*		Native	x	x		x	x	
CRUSTACEA	*Lysianassa ewa*	Barnard, 1970	Native					x	
CRUSTACEA	*Maera pacifica*	Schellenberg, 1938	Native				x		
CRUSTACEA	*Metopograpsus thukuhar*	(Owen, 1893)	Native						x
CRUSTACEA	*Parapseudes neglectus*	Miller, 1940	Native	x		x			
CRUSTACEA	*Phymodius nitidus*	(Dana, 1852)	Native					x	x
CRUSTACEA	*Phymodius sp.*		Native			x	x		
CRUSTACEA	*Pilumnus oahuensis*	Edmondson, 1931	Introduced	x	x			x	
CRUSTACEA	*Pilumnus vespertilio*	(Fabricus, 1793)	Native					x	
CRUSTACEA	*Stenopus hispidus*	(Olivier, 1811)	Native	x					
CRUSTACEA	*Thalamita dakini*	Montgomerey, 1931	Native	x		x			
		Total Crustaceans	31	10	6	8	10	11	10
BRYOZOA	*Amathia distans*	Busk, 1886	Introduced	x	x		x	x	
BRYOZOA	*Bugula dentata*	(Lamauroux, 1816)	Introduced	x	x	x	x		
BRYOZOA	*Bugula neritina*	(Linnaeus, 1758)	Introduced					x	x
BRYOZOA	*Diaperoforma sp.*		Native	x	x	x	x		
BRYOZOA	*Ectoprocta unid. sp.*		Native						
BRYOZOA	*Schizoporella cf. errata*	(Waters, 1878)	Introduced		x		x	x	
BRYOZOA	*Watersipora edmondsoni*	Soule and Soule, 1968	Introduced				x	x	

Taxa	*Scientific name*	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19	KL20
BRYOZOA	*Zoobotryon verticillatum*	(delle Chiaje, 1828)	Introduced				x		
		Total Bryozoans	8	3	4	2	6	4	1
ECHINODERMS	*Diadema paucispinum*	Agassiz, 1863	Native			x			
ECHINODERMS	*Echinometra mathaei*	(Blainville, 1825)	Native	x		x			
ECHINODERMS	*Echinothrix calamaris*	(Pallas, 1774)	Native	x		x			
ECHINODERMS	*Eucidaris metularia*	Lamarck, 1816	Native			x			
ECHINODERMS	*Heterocentrotus mammillatus*	(Linnaeus, 1758)	Native			x			
ECHINODERMS	*Holothuria (Thymiosycia) impatiens*	(Forskal, 1775)	Native			x			
ECHINODERMS	*Holothuria unid. sp.*		Native			x			
ECHINODERMS	*Ophiactis savignyi*	(Muller and Troschel, 1842)	Cryptogenic	x	x		x	x	
ECHINODERMS	*Ophiocoma erinaceus*	Muller and Troschel, 1842	Native	x		x			
ECHINODERMS	*Tripneustes gratilla*	(Linnaeus, 1758)	Native			x			
		Total Echinoderms	10	4	1	9	1	1	0
ASCIDACEA	*Ascidea unid. sp.*		Native				x		
ASCIDACEA	*Ascidia sp. B*		Introduced				x		
ASCIDACEA	*Ascidia sydneiensis*	Stimpson, 1855	Introduced	x					
ASCIDACEA	*Botrylloides simodensis*	Saito & Watanabe, 1981	Introduced				x		
ASCIDACEA	*Botrylloides sp.*		Native					x	
ASCIDACEA	*Botryllus spp.*		Native				x		
ASCIDACEA	*Didemnum cf. candidum*	Savigny, 1816	Introduced	x			x	x	
ASCIDACEA	*Didemnum perlucidum*	Monniot, 1983	Introduced	x					
ASCIDACEA	*Diplosoma cf. spongiforme*	(Giard, 1872)	Introduced					x	
ASCIDACEA	*Eusynstyela hartmeyeri*	Michaelson, 1904	Introduced				x		
ASCIDACEA	*Herdmania mauritiana*	(Drasche, 1884)	Introduced		x				
ASCIDACEA	*Herdmania pallida*	(Savigny, 1816)	Introduced	x			x	x	
ASCIDACEA	*Microcosmus exasperatus*	Heller, 1878	Introduced	x			x	x	
ASCIDACEA	*Phallusia nigra*	Savigny, 1816	Introduced		x	x	x	x	
ASCIDACEA	*Polyandrocarpa sagamiensis*	Tokioka, 1953	Introduced	x					
ASCIDACEA	*Polycarpa aurita*	(Sluiter, 1890)	Native					x	
ASCIDACEA	*Polycarpa cryptocarpa*	(Sluiter, 1885)	Cryptogenic	x	x				
ASCIDACEA	*Polyclinum cf. constellatum*	Savigny, 1816	Introduced				x		
ASCIDACEA	*Pyura sp.*		Native	x					
ASCIDACEA	*Styela canopus*	Savigny, 1816	Introduced					x	
		Total Ascidians	20	8	3	1	10	8	0
Osteichthyes	*Abudefduf abdominalis*	(Quoy and Gaimard, 1824)	Native	x		x	x	x	x
Osteichthyes	*Acanthurus blochii*	Valenciennes 1835	Native	x					
Osteichthyes	*Acanthurus leucopareius*	(Jenkins, 1903)	Native	x					
Osteichthyes	*Acanthurus triostegus*	(Linnaeus, 1758)	Native	x	x	x	x		
Osteichthyes	*Canthigaster jactator*	(Jenkins, 1901)	Native	x	x	x		x	
Osteichthyes	*Centropyge loriculus*	(Günther, 1860)	Introduced			x			
Osteichthyes	*Chaetodon auriga*	Forsskål 1775	Native		x				
Osteichthyes	*Chromis vanderbilti*	(Fowler, 1941)	Native	x					
Osteichthyes	*Dascyllus albisella*	Gill 1862	Native	x	x				
Osteichthyes	*Diodon hystrix*	Linnaeus 1758	Native					x	
Osteichthyes	*Echidna nebulosa*	(Ahl, 1789)	Native	x					
Osteichthyes	*Kuhlia sandvicensis*	(Steindachner, 1876)	Native				x		
Osteichthyes	*Lutjanus fulvus*	(Forster in Bloch and Schneider, 1801)	Introduced	x					
Osteichthyes	*Mulloidichthys vanicolensis*	(Valenciennes, 1831)	Native	x					
Osteichthyes	*Plectroglyphidodon imparipennis*	(Vaillant and Sauvage, 1875)	Native			x			

Taxa	*Scientific name*	Author_Date	Origin	HH08	HH11	HH14	KL18	KL19	KL20
Osteichthyes	*Saurida sp.*	Waples 1981	Native	x					
Osteichthyes	*Scarus sp. juv.*		Native	x		x			
Osteichthyes	*Stegastes fasciolatus*	(Ogilby, 1889)	Native			x			
Osteichthyes	*Thalassoma duperrey*	(Quoy and Gaimard, 1824)	Native	x		x			
Osteichthyes	*Thalassoma purpureum*	(Forsskål, 1775)	Native			x			
Osteichthyes	*Zanclus cornutus*	(Linnaeus, 1758)	Native	x					
Osteichthyes	*Zebrasoma flavescens*	(Bennett, 1828)	Native	x					
		Total Fish	22	15	4	9	3	3	1
		Total Taxa	195	84	57	66	51	54	17
		Cryptogenic	21	12	12	5	5	6	0
		Introduced	47	15	11	7	23	21	10
		Intr+Crypto	68	27	23	12	28	27	10
		% NIS	34.9%	32.1%	40.4%	18.2%	54.9%	50.0%	58.8%

APPENDIX E

Introduced or Cryptogenic Species Collected in Honolulu Harbor or Ke‘ehi Lagoon in 2007-2008

Taxa	Scientific name	Origin	HH08	HH11	HH14	KL18	KL19	KL20
Chlorophyta	*Acanthophora spicifera*	Introduced			x			
Rhodophyta	*Gracilaria salicornia*	Introduced					x	
Rhizophoraceae	*Rhizophora mangle*	Introduced					x	x
PORIFERA	*?Tedania sp.*	Cryptogenic			x			
PORIFERA	*Biemna fistulosa*	Cryptogenic	x	x	x		x	
PORIFERA	*Iotrochota baculifera*	Cryptogenic		x				
PORIFERA	*Iotrochota purpurea*	Cryptogenic	x	x				
PORIFERA	*Monanchora dianchora*	Cryptogenic	x	x			x	
PORIFERA	*Raspailia (Clathriodendron) ?darwinensis*	Cryptogenic	x					
PORIFERA	*Raspailia (Clathriodendron) darwinensis*	Cryptogenic		x				
PORIFERA	*Raspailia (Clathriodendron) sp.*	Cryptogenic	x	x				
PORIFERA	*Scopalina sp.*	Cryptogenic	x					
PORIFERA	*Tedania (Tedania) ignis*	Cryptogenic	x				x	
PORIFERA	*Tedania sp.*	Cryptogenic		x				
PORIFERA	*?Haliclona (Soestella) coerulea*	Introduced		x		x		
PORIFERA	*Dysidea arenaria*	Introduced		x		x	x	
PORIFERA	*Haliclona (Soestella) coerulea*	Introduced	x				x	
PORIFERA	*Mycale (Mycale) grandis*	Introduced		x			x	
PORIFERA	*Mycale (Zygomycale) parishi*	Introduced				x	x	
PORIFERA	*Suberites aurantiacus*	Introduced				x		
CNIDARIA	*Clytia cf. gracilis*	Cryptogenic				x		
CNIDARIA	*Halopteris plagiocampa*	Cryptogenic	x		x			
CNIDARIA	*Ventromma halecioides*	Cryptogenic				x		
CNIDARIA	*Obelia bidentata*	Introduced						x
CNIDARIA	*Pennaria disticha*	Introduced	x			x	x	
ANNELIDA	*Amphiglena sp.*	Cryptogenic		x				
ANNELIDA	*Branchiomma nigromaculata*	Cryptogenic	x	x		x		
ANNELIDA	*Oenone fulgida*	Cryptogenic					x	
ANNELIDA	*Pomatoleios kraussii*	Introduced				x		
ANNELIDA	*Sabellastarte spectabilis*	Introduced	x	x	x	x	x	
ANNELIDA	*Salmacina dysteri*	Introduced	x			x		
MOLLUSCA	*Zafra cf. hervieri*	Cryptogenic			x			
MOLLUSCA	*Crassostrea sp.*	Introduced		x	x	x		x
MOLLUSCA	*Vermetus alli*	Introduced					x	
CRUSTACEA	*Leptochelia dubia*	Cryptogenic	x	x	x	x	x	
CRUSTACEA	*Balanus amphitrite*	Introduced						x
CRUSTACEA	*Balanus eburneus*	Introduced						x
CRUSTACEA	*Balanus reticulatus*	Introduced				x		x
CRUSTACEA	*Balanus sp.*	Introduced						x
CRUSTACEA	*Chthamalus proteus*	Introduced			x			x
CRUSTACEA	*Corophium sp.*	Introduced						x
CRUSTACEA	*Ericthonius brasiliensis*	Introduced					x	
CRUSTACEA	*Glabropilumnus seminudus*	Introduced	x					
CRUSTACEA	*Pilumnus oahuensis*	Introduced	x	x			x	
BRYOZOA	*Amathia distans*	Introduced	x	x		x	x	
BRYOZOA	*Bugula dentata*	Introduced	x	x	x	x		
BRYOZOA	*Bugula neritina*	Introduced					x	x
BRYOZOA	*Schizoporella cf. errata*	Introduced		x		x	x	
BRYOZOA	*Watersipora edmondsoni*	Introduced				x	x	
BRYOZOA	*Zoobotryon verticillatum*	Introduced				x		
ECHINODERMS	*Ophiactis savignyi*	Cryptogenic	x	x		x	x	
ASCIDACEA	*Polycarpa cryptocarpa*	Cryptogenic	x	x				
ASCIDACEA	*Ascidia sp. B*	Introduced				x		

Taxa	Scientific name	Origin	HH08	HH11	HH14	KL18	KL19	KL20
ASCIDACEA	*Ascidia sydneiensis*	Introduced	x					
ASCIDACEA	*Botrylloides simodensis*	Introduced				x		
ASCIDACEA	*Didemnum cf. candidum*	Introduced	x			x	x	
ASCIDACEA	*Didemnum perlucidum*	Introduced	x					
ASCIDACEA	*Diplosoma cf. spongiforme*	Introduced					x	
ASCIDACEA	*Eusynstyela hartmeyeri*	Introduced				x		
ASCIDACEA	*Herdmania mauritiana*	Introduced		x				
ASCIDACEA	*Herdmania pallida*	Introduced	x			x	x	
ASCIDACEA	*Microcosmus exasperatus*	Introduced	x			x	x	
ASCIDACEA	*Phallusia nigra*	Introduced		x	x	x	x	
ASCIDACEA	*Polyandrocarpa sagamiensis*	Introduced	x					
ASCIDACEA	*Polyclinum cf. constellatum*	Introduced				x		
ASCIDACEA	*Styela canopus*	Introduced					x	
Osteichthyes	*Centropyge loriculus*	Introduced			x			
Osteichthyes	*Lutjanus fulvus*	Introduced	x					
	Total Taxa	195	84	57	66	51	54	17
	Cryptogenic	21	12	12	5	5	6	0
	Introduced	47	15	11	7	23	21	10
	Intr+Crypto	68	27	23	12	28	27	10
	% NIS	34.9%	32.1%	40.4%	18.2%	54.9%	50.0%	58.8%

APPENDIX F

Genera and Species not Previously Reported in Honolulu Harbor or Keʻehi Lagoon

Taxa	Scientific name	HH08	HH11	HH14	KL18	KL19	KL20
Rhodophyta	*Gracilaria salicornia*					x	
Total Algae	1						
PORIFERA	*?Stylinos sp.*	x		x			
PORIFERA	*Iotrochota baculifera*		x				
PORIFERA	*Iotrochota purpurea*	x	x				
PORIFERA	*Monanchora dianchora*	x	x			x	
PORIFERA	*Raspailia (Clathriodendron) darwinensis*		x				
PORIFERA	*Raspailia (Clathriodendron) sp.*	x	x				
PORIFERA	*Scopalina sp.*	x					
PORIFERA	*Suberites aurantiacus*				x		
PORIFERA	*Tedania (Tedania) ignis*	x				x	
Total Sponges	9	6	5	1	1	2	0
CNIDARIA	*Clytia cf. gracilis*				x		
CNIDARIA	*Halopteris plagiocampa*	x		x			
CNIDARIA	*Obelia bidentata*						x
CNIDARIA	*Ventromma halecioides*				x		
Total Cnidarians	4	x	0	x	2	0	x
MOLLUSCA	*Chama iostoma*					x	
MOLLUSCA	*Conus miles*	x					
MOLLUSCA	*Hypselodoris infucata*					x	
Total Molluscs	3	1	0	0	0	2	0
ANNELIDA	*?Demonax sp.*	x					
ANNELIDA	*Amphiglena sp.*		x				
ANNELIDA	*Oenone fulgida*					x	
ANNELIDA	*Perinereis curvata*		x				
Total Polychaetes	4	1	2	0	0	1	0
ARTHROPODA	*Ampithoe sp.*				x		
ARTHROPODA	*Glabropilumnus seminudus*	x					
ARTHROPODA	*Grapsus tenuicrustatus*			x			
ARTHROPODA	*Hyastenus tenuicornis*					x	
ARTHROPODA	*Pilumnus vespertilio*					x	
ARTHROPODA	*Thalamita dakini*	x		x			
Total Crustaceans	6	2	0	2	1	2	0
ECHINODERMATA	*Holothuria (Thymiosycia) impatiens*			x			
ECHINODERMATA	*Ophiocoma erinaceus*	x		x			
Total Echinoderms	2	1	0	2	0	0	0
ASCIDACEA	*Botryllus spp.*				x		
ASCIDACEA	*Didemnum perlucidum*	x					
ASCIDACEA	*Diplosoma cf. spongiforme*					x	
ASCIDACEA	*Eusynstyela hartmeyeri*				x		
ASCIDACEA	*Herdmania mauritiana*		x				
ASCIDACEA	*Herdmania pallida*	x			x	x	
ASCIDACEA	*Polycarpa cryptocarpa*	x	x				
ASCIDACEA	*Pyura sp.*	x					
Total Ascidacea	8	4	2	0	3	2	0
Osteichthyes	*Centropyge loriculus*			x			
Osteichthyes	*Chromis vanderbilti*	x					
Osteichthyes	*Echidna nebulosa*	x					
Osteichthyes	*Plectroglyphidodon imparipennis*			x			
Total Fish	4	2	0	2	0	0	0

Taxa	Scientific name	HH08	HH11	HH14	KL18	KL19	KL20
Total Taxa	195	84	58	65	51	54	17
New Genera or Species	41	18	9	8	7	10	1
% New HH or KL Reports	21.0%	21.4%	15.5%	12.3%	13.7%	18.5%	5.9%

APPENDIX G

Listing of Marine or Estuarine Organisms Collected or Observed in Pearl Harbor from all Available Sources, Including Present Study

Legacy Project - Species Report

KINGDOM: MONERA

Phylum: CYANOPHYCOTA
Class: CYANOPHYCEAE
Order: NOSTOCALES
Family: OSCILLATORIACEAE
Genus: *Lyngbya*
Lyngbya sp.
1996 Legacy Project (Coles et al., 1997)

Lyngbya majuscula **(Dillwyn) Harv. Ex Gomont**
2007 Ref - Brock, 2007

Genus: *Phormidium*
Phormidium crosbyamum
1982 Spec - BPBM-AL 523155 E shore of entrance; reef at Fort Kamehameha.

KINGDOM: PROTISTA

Phylum: CHRYSOPHYTA
Class: CHRYSOPHYCEAE
Genus: *Chrysonephos*
Chrysonephos lewisii **(Taylor, 1951)**
1972 Ref - Long, 1974

Phylum: BACILLARIOPHYTA
Class: BACILLARIOPHYCEAE
Order: CENTRALES
Family: CHAETOCERACEAE
Genus: *Chaetoceros*
Chaetoceros sp.
1978 Ref - Grovhoug, 1979

Family: COSCINODISCACEAE
Genus: *Coscinodiscus*
Coscinodiscus sp.
1973 Ref - Evans et al., 1974

Family: MELOSIRACEAE
Genus: *Melosira*
Melosira sp.
1978 Ref - Grovhoug, 1979

Family: THALASSIOSIRACEAE
Genus: *Skeletonema*
Skeletonema sp.
1978 Ref - Grovhoug, 1979

Order: PENNALES
Unidentified Pennales
1978 Ref - Grovhoug, 1979

Family: DIATOMACEAE
Genus: *Thalassionema*
Thalassionema sp.
1978 Ref - Grovhoug, 1979

Legacy Project - Species Report (Cont.)

Family: NAVICULACEAE
Genus: *Navicula*
Navicula sp.
1978 Ref - Grovhoug, 1979

Family: NITZSCHIACEAE
Genus: *Nitzschia*
Nitzschia sp.
1978 Ref - Grovhoug, 1979

Phylum: CHLOROPHYCOTA
Family: Derbesiaceae
Genus: *Derbesia*
Derbesia tenuissima **(Moris & De Notaris) Crouan & Crouan**
2007 Ref - Brock, 2007 Recorded as Derbesua tenuissima.

Class: CHLOROPHYCEAE
Order: ULOTRICHALES
Family: ULVACEAE
Genus: *Enteromorpha*
Enteromorpha intestinalis **((Linnaeus) Link, 1820)**
1972 Ref - Long, 1974 Off Pearl Harbor.
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Ulva*
Ulva sp.
1943 Ref - Hutchins, 1949

Ulva fasciata **Delile, 1813**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Ulva lactuca **Linnaeus, 1753 Indigenous. Hawaiian name(s): kohu/ lipehe.**
1973 Ref - Evans et al., 1974

Ulva reticulata **Forsskål, 1775**
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: CLADOPHORALES
Family: CLADOPHORACEAE
Genus: *Chaetomorpha*
Chaetomorpha indica **Kützing**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Cladophora*
Cladophora sp. **Indigenous.**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Cladophora fascicularis **(Mertens)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: CAULERPALES
Family: CAULERPACEAE
Genus: *Caulerpa*
Caulerpa racemosa **(Forsskal) J. Agardh, 1872**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Caulerpa sertularioides **(Gmelin) Howe, 1905**
Unknown Spec - BPBM-AL 515478 Middle Loch.
1973 Ref - Evans et al., 1974

1996 Legacy Project (Coles et al., 1997)

Caulerpa verticillata **J. Agardh, 1847**
1973 Ref - Evans et al., 1974

Family: CODIACEAE
Genus: *Chlorodesmis*
Chlorodesmis caespitosa **J. Agardh**
1996 Legacy Project (Coles et al., 1997)

Genus: *Codium*
Codium arabicum **Kützing, 1856**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Codium dichotomum **(Hudson, 1762)**
1972 Ref - Long, 1974 Off Pearl Harbor.

Codium edule **Silva, 1952**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Codium reediae **Silva, in Egerod, 1952**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Halimeda*
Halimeda discoidea **Decaisne, 1842**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: SIPHONOCLADALES
Family: SIPHONOCLADACEAE
Genus: *Cladophoropsis*
Cladophoropsis luxurians **Gilbert, 1962**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Family: VALONIACEAE
Genus: *Boodlea*
Boodlea composita **((Harvey & Hooker) Brand, 1905)**
Unknown Spec - BPBM-AL 92645
1996 Legacy Project (Coles et al., 1997)

Boodlea hiloense **(Pilsbry & Vanatta, 1908)**
1973 Ref - Evans et al., 1974

Genus: *Dictyosphaeria*
Dictyosphaeria versluysii **Weber-van Bosse, 1905 Indigenous.**
1996 Legacy Project (Coles et al., 1997)

Phylum: PYRROPHYCOPHYTA
Class: DINOPHYCEAE
Order: PROROCENTRALES
Family: PROROCENTRACEAE
Genus: *Prorocentrum*
Prorocentrum gracile **Schott**
1973 Ref - Evans et al., 1974

Order: DINOPHYSIALES
Family: DINOPHYSIACEAE
Genus: *Dinophysis*
Dinophysis sp.?
1978 Ref - Grovhoug, 1979

Dinophysis caudatum **(Kent)**
1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Order: PERIDINIALES
Family: CERATIACEAE
Genus: *Ceratium*
Ceratium ferka **(Ehrenberg)**
1973 Ref - Evans et al., 1974

Family: GONYAULACEAE
Genus: *Gonyaulax*
Gonyaulax minutum **Michener**
1973 Ref - Evans et al., 1974

Family: GYMNODINIACEAE
Genus: *Cochlodinium*
Cochlodinium catenatum **Okamura**
1973 Ref - Evans et al., 1974

Family: NOCTILUCACEAE
Genus: *Noctiluca*
Noctiluca minuta **(McCartney & Kofoid)**
1973 Ref - Evans et al., 1974

Family: PERIDINIACEAE
Genus: *Peridinium*
Peridinium crassipes **(Kofoid)**
1973 Ref - Evans et al., 1974

Family: POLYKRIKACEAE
Genus: *Polykrikos*
Polykrikos schwartzi **(Butschli)**
1973 Ref - Evans et al., 1974

Phylum: PHAEOPHYCOPHYTA
Class: PHAEOPHYCEAE
Order: ECTOCARPALES
Family: RALFSIACEAE
Genus: *Ralfsia*
Ralfsia occidentalis **Hollenberg**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: DICTYOTALES
Family: DICTYOTACEAE
Genus: *Dictyota*
Dictyota sp. **Indigenous.**
2007 This Project

Dictyota sp.? **Indigenous.**
1978 Ref - Grovhoug, 1979 Recorded as Dictyocha.

Dictyota acutiloba **J. Agardh, 1848**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Dictyota bartayresii **Lamouroux**
2007 Ref - Brock, 2007

Dictyota divaricata **Lamouroux, 1809**
1972 Ref - Long, 1974 Off Pearl Harbor.
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Lobophora*
Lobophora variegata **(Lamouroux) Indigenous.**
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Legacy Project - Species Report (Cont.)

Genus: *Padina*

Padina sp. **Indigenous.**
2008 This Project

Padina japonica **Boergesen**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Padina pavonica **(Linnaeus, 1758)**
1972 Ref - Long, 1974 Off Pearl Harbor.

Order: FUCALES
Family: SARGASSACEAE
Genus: *Sargassum*

Sargassum echinocarpum **J. Agardh**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Sargassum obtusifolium **J. Agardh**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Sargassum polyphyllum **J. Agardh**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: SCYTOSIPHONALES
Family: SCYTOSIPHONACEAE
Genus: *Colpomenia*

Colpomenia sinuosa **(Roth)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Hydroclathrus*

Hydroclathrus clathratus **(C. Agardh)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Phylum: RHODOPHYCOTA
Family: GELIDIACEAE
Genus: *Gelidium*

Gelidium sp.
1996 Legacy Project (Coles et al., 1997)

Gelidium arenaria **Kylin**
1996 Legacy Project (Coles et al., 1997)

Gelidium pusillum **(Stackhouse) Lejolis, 1863**
1996 Legacy Project (Coles et al., 1997)

Family: PEYSONNELIACEAE
Genus: *Peysonnelia*

Peysonnelia sp.
1996 Legacy Project (Coles et al., 1997)

Class: RHODOPHYCEAE
Order: NEMALIALES
Family: BONNEMAISONIACEAE
Genus: *Asparagopsis*

Asparagopsis taxiformis **(Delile)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Family: GELIDIELLACEAE
Genus: *Gelidiella*

Gelidiella sp. **Indigenous.**
1982 Spec - BPBM-AL 585470 E shore of entrance; reef at Fort Kamehameha.
2007 This Project

Gelidiella sp. 1
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Gelidiella sp. 2
1996 Legacy Project (Coles et al., 1997)

Gelidiella myrocladia **(Borgesen) Feldmann & Hamel, 1934**
1996 Legacy Project (Coles et al., 1997)

Order: GIGARTINALES
Family: GRACILARIACEAE
Genus: *Gracilaria*

Gracilaria bursapastoris **(Gmelin)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Gracilaria coronopifolia **J. Agardh, 1852**
1978 Spec - BPBM-AL 561794 Reef flat between W end of the Reef Runway & entrance to Pearl Harbor; opposite the National Guard hanger area.
1978 Spec - BPBM-AL 561795 Reef flat between W end of the Reef Runway & entrance to Pearl Harbor; opposite the National Guard hanger area.
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Gracilaria lichenoides **Linnaeus**
1973 Ref - Evans et al., 1974

Gracilaria parvispora **Abbott, 1985**
1978 Spec - BPBM-AL 562094 Reef flat between W end of the Reef Runway & entrance to Pearl Harbor; opposite the National Guard hanger area. Identified by fide.I.A.Abbott 1994.

Gracilaria salicornia **(Agardh) Dawson Introduced. Common name(s): Gorilla Ogo.**
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Family: HYPNEACEAE
Genus: *Hypnea*

Hypnea cervicornis **J. Agardh**
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Hypnea spinella **(C. Agardh) Kutzing, 1849**
1996 Legacy Project (Coles et al., 1997)

Hypnea valentiae **(Turner) Montagne, 1841**
1996 Legacy Project (Coles et al., 1997)

Family: PLOCAMIACEAE
Genus: *Plocamium*

Plocamium sandvicense **J. Agardh**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: CRYPTONEMIALES
Family: CORALLINACEAE
Genus: *Amphiroa*

Amphiroa fragilissima **(Linnaeus)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Corallina*

Corallina sp.
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Jania*

Jania sp.
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Legacy Project - Species Report (Cont.)

Genus: *Lithothamnium*
Lithothamnium byssoides
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Porolithon*
Porolithon onkodes **(Heydrich) Foslie, 1909**
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Family: CRYPTONEMIACEAE
Genus: *Halymenia*
Halymenia formosa **Harvey**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Family: RHIZOPHYLLIDACEAE
Genus: *Chondrococus*
Chondrococus hornemannii **(Harvey)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: RHODYMENIALES
Family: CHAMPIACEAE
Genus: *Champia*
Champia parvula **(C. Agardh)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Family: RHODYMENIACEAE
Genus: *Coelothrix*
Coelothrix irregularis **(Harv.) Børgesen**
2007 Ref - Brock, 2007

Coelothrix irreqularis **(Harvey)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Order: CERAMIALES
Family: CERAMIACEAE
Genus: *Aglaothamnion*
Aglaothamnion sp. 1
1996 Legacy Project (Coles et al., 1997)

Aglaothamnion sp. 2
1996 Legacy Project (Coles et al., 1997)

Genus: *Anotricium*
Anotricium sp.
1996 Legacy Project (Coles et al., 1997)

Anotricium secundum **Caormaci, Funari & Pizzuto**
1996 Legacy Project (Coles et al., 1997)

Genus: *Centroceras*
Centroceras clavulatum **(C. Agardh)**
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Genus: *Centrocerus*
Centrocerus sp.
1996 Legacy Project (Coles et al., 1997)

Genus: *Ceramium*
Ceramium sp.
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Ceramium sp. 1
1996 Legacy Project (Coles et al., 1997)

Ceramium sp. 2
1996 Legacy Project (Coles et al., 1997)

Ceramium clarionense **Setchell and Gardner, 1930**
1996 Legacy Project (Coles et al., 1997)

Genus: *Griffithsia*
Griffithsia sp.
1973 Ref - Evans et al., 1974 Recorded as Griffitsia.
1979 Ref - AECOS, 1979 Off Pearl Harbor. Recorded as Griffitsia.

Griffithsia heteromorpha **Kützing, 1863**
1996 Legacy Project (Coles et al., 1997)

Genus: *Spyridia*
Spyridia sp. **Indigenous.**
2007 This Project

Spyridia filamentosa **(Wulfen)**
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Tolypiocladia*
Tolypiocladia sp.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Tolypiocladia glomerulata **(C. Agardh) Schmitz, 1897**
1996 Legacy Project (Coles et al., 1997)

Family: RHODOMELACEAE
Genus: *Acanthophora*
Acanthophora spicifera **(Vahl, 1802) Introduced. Common name(s): Spiny Seaweed; Hawaiian name(s): ‘o‘opu-hue.**
1961 Ref - Doty, 1961
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Genus: *Laurencia*
Laurencia brachyclados **Pilger**
1996 Legacy Project (Coles et al., 1997)

Laurencia nidifica **J. Agardh**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Polysiphonia*
Polysiphonia sp.
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Polysiphonia mollis **J. Hooker & Harvey in Harvey, 1847**
Unknown Spec - BPBM-AL 189658

Unknown Spec - BPBM-AL 189659 West Loch.

Polysiphonia scopulorum **(Harvey) Hollenberg, 1968**
1996 Legacy Project (Coles et al., 1997)

Polysiphonia subtilissima **Montagne**
1973 Ref - Evans et al., 1974

Phylum: PROTOZOA
Class: GRANULORETICULOSEA
Order: FORAMINIFERIDA
Unidentified Foraminiferida
1978 Ref - Grovhoug, 1979
1982 Spec - BPBM-A 174 Pearl Harbor dredge spoil dumping site.
2008 This Project

Family: AMPHISTEGINIDAE
Genus: *Amphistegina*
Amphistegina lessonii **d'Orbigny, 1826**
1977 Spec - BPBM-A 160 Off Pearl Harbor. Identified by Philip Papish, 1980.

Amphistegina lobifera **Larsen, 1976**
1977 Spec - BPBM-A 161 Off Pearl Harbor. Identified by Philip Papish, 1980.

Class: CILIATEA
Family: FOLLICULINIDAE
Genus: *Parafolliculina*
Parafolliculina violaceae **Giard, 1888**
1975 Ref - Grovhoug, 1976

KINGDOM: PLANTAE

Phylum: BRYOPHYTA
Class: HEPATICOPSIDA
Order: JUNGERMANNIALES
Family: MASTIGOPHORACEAE
Genus: *Mastigophora*
Mastigophora sp.
1972 Ref - Long, 1974 Off Pearl Harbor.

Phylum: MAGNOLIOPHYTA
Class: MAGNOLIOPSIDA
Order: ROSALES
Family: LEGUMINOSAE
Genus: *Lathyrus*
Lathyrus sp.
1933 Spec - BPBM-MO 205313 Ford Island. Catalogue XIV.

Order: CORNALES
Family: RHIZOPHORACEAE
Genus: *Rhizophora*
Rhizophora mangle **Linnaeus** **Introduced. Common name(s): Red Mangrove.**
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Legacy Project - Species Report (Cont.)

KINGDOM: ANIMALIA

Phylum: PORIFERA

Unidentified Porifera

1979	Ref - AECOS, 1979	orange.
1979	Ref - AECOS, 1979	blue-green.
1979	Ref - AECOS, 1979	light-purple.
1982	Spec - BPBM-C 437	Off Pearl Harbor dredge spoil dumping site.
1987	Ref - Brewer & Assoc., 1987	encrust. red.
1987	Ref - Brewer & Assoc., 1987	branch. brown.
1987	Ref - Brewer & Assoc., 1987	blue-green.

Family: CRAMBEIDAE

Genus: *Monanchora*

Monanchora clathrata **Carter, 1883 New record for Hawaii. Cryptogenic.**

2008 This Project

Family: DESMACIDIDAE

Genus: *Iotrochota*

Iotrochota sp. **Indigenous. Common name(s): Black Staining Sponge.**

2007 This Project

2008 This Project

Iotrochota purpurea **(Bowerbank,, 875) New record for Hawaii. Cryptogenic.**

2008 This Project

Family: PETROSIIDAE

Genus: *Petrosia*

Petrosia sp. **Indigenous.**

2008 This Project

Family: PHORIOSPONGIIDAE

Genus: *Strongylacidon*

Strongylacidon kaneohe **(de Laubenfels, 1950) Indigenous.**

2008 This Project

Class: CALCAREA

Order: LEUCETTIDA

Family: LEUCASCIDAE

Genus: *Leucetta*

Leucetta solida **de Laubenfels, 1950 Indigenous.**

2008 This Project

Order: LEUCOSOLENIIDA

Family: LEUCOSOLENIIDAE

Genus: *Leuconia*

Leuconia n. sp. **Known only from Hawaii.**

1996 Legacy Project (Coles et al., 1997)

Order: SYCETTIDA

Family: HETEROPIIDAE

Genus: *Heteropia*

Heteropia glomerosa **(Bowerbank, 1873) Cryptogenic.**

1996 Legacy Project (Coles et al., 1997)

Family: SYCETTIDAE

Genus: *Sycon*

Sycon sp.

1972 Ref - Long, 1974 Off Pearl Harbor.

Legacy Project - Species Report (Cont.)

Class: DEMOSPONGIAE
Order: DICTYOCERATIDA
Family: SPONGIIDAE
Genus: *Hyatella*

Hyatella intestinalis **Lamarck, 1814 Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Genus: *Spongia*

Spongia oceania **de Laubenfels, 1950**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Order: DENDROCERATIDA
Family: APLYSELLIDAE
Genus: *Aplysilla*

Aplysilla cf. rosea **Barrois, 1876**
1996 Legacy Project (Coles et al., 1997)

Genus: *Chelonaplysilla*

Chelonaplysilla violacea **Lendenfeld, 1883 Indigenous.**
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Family: DICTYODEDRILLIDAE
Genus: *Dictyodendrilla*

Dictyodendrilla n. sp. **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Dictyodendrilla sp. **Indigenous.**
2008 This Project

Family: DYSIDEIDAE
Genus: *Dendrilla*

Dendrilla cactus **(Selenka, 1867)**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Genus: *Dysidea*

Dysidea n. sp. 1 **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Dysidea n. sp. 2 **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Dysidea n. sp. 3 **Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Dysidea sp. **Indigenous.**
2008 This Project

Dysidea arenaria **(Schmidt, 1862) Introduced. Common name(s): Acquistive Sponge.**
2007 This Project
2008 This Project

Dysidea avara **sensu de Laubenfels 1950**
1996 Legacy Project (Coles et al., 1997)

Dysidea cf. arenaria **Bergquist, 1965 Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Dysidea herbacea **(Keller, 1889)**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Legacy Project - Species Report (Cont.)

Genus: *Euryspongia*
Euryspongia lobata
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Order: HAPLOSCLERIDA
Family: CALLYSPONGIIDAE
Genus: *Callyspongia*
Callyspongia diffusa **(Ridley, 1884)**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Family: CHALINIDAE
Genus: *Cladocroce*
Cladocroce burapha **Putchakarn, de Weerdt, Sonchaeng & van Soest, 2004 New record for Hawaii.**
Cryptogenic.
2007 This Project
2008 This Project

Genus: *Toxiclona*
Toxiclona n. sp. **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Family: HALICLONIDAE
Genus: *Gellius*
Gellius n. sp.
1996 Legacy Project (Coles et al., 1997)

Genus: *Haliclona*
Haliclona sp. **Indigenous.**
2007 This Project

Haliclona (Reniera) sp. 1 **Indigenous.**
2008 This Project

Haliclona (Reniera) sp. 2 **Indigenous.**
2008 This Project

Haliclona (Soestella) caerulea **(Hechtel, 1965) Introduced.**
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Haliclona aquaeducta **Schmidt, 1862**
1993 Ref - Brock, 1994 Recorded as H. aquaedactyla.
1994 Ref - Brock, 1995 Recorded as H. aquaedactyla.
2007 Ref - Brock, 2007

Family: NIPHATIDAE
Genus: *Gelliodes*
Gelliodes sp. **Indigenous.**
2008 This Project

Gelliodes fibrosa **(Wilson) Introduced.**
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Order: POECILOSCLERIDA
Family: ADOCIIDAE
Unidentified Adociidae n. gen. n. sp.
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Pellina*

Pellina eusiphonia **Ridley, 1884**

1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Genus: *Toxadocia*

Toxadocia violacea **de Laubenfels, 1950**

1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Family: AMPHILECTIDAE

Genus: *Biemna*

Biemna fistulosa **Topsent, 1897 Cryptogenic. Common name(s): Tubular Biiemna.**

1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Family: Coelosphaeridae

Genus: *Lissodendoryx*

Lissodendoryx (Lissodendoryx) similis **New record for Hawaii. Cryptogenic.**

2008 This Project

Family: Hymedesmiidae

Genus: *Hamigera*

Hamigera sp. **Indigenous. Common name(s): Red Boring Sponge.**

2007 This Project

Family: MICROCIONIDAE

Genus: *Clathria*

Clathria sp. **Indigenous. Common name(s): Vermilion Clathria.**

2008 This Project

Clathria (Microciona) n. sp. **Known only from Hawaii.**

1996 Legacy Project (Coles et al., 1997)

Clathria (Microciona) maunaloa **de Laubenfels, 1951**

1993 Ref - Brock, 1994 Recorded as Microciona maunaloa.
1994 Ref - Brock, 1995 Recorded as Microciona maunaloa.
2007 Ref - Brock, 2007 Recorded as Microciona maunaloa.

Family: MYCALIDAE

Genus: *Mycale*

Mycale sp. **Cryptogenic.**

1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Mycale (Carmia) cecilia **(de Laubenfels, 1936) Introduced.**

1973 Ref - Evans et al., 1974 Recorded as Mycale sp..
1973 Ref - McCain, 1974 Recorded as Mycale cecilia.
1973 Ref - McCain, 1975 Recorded as Mycale cecilia.
1993 Ref - Brock, 1994 Recorded as Mycale cecilia.
1994 Ref - Brock, 1995 Recorded as Mycale cecilia.
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007 Recorded as Mycale cecilia.
2008 This Project

Mycale (Carmia) contarenii **sensu de Laubenfels, 1951**

1996 Legacy Project (Coles et al., 1997)

Mycale (Carmia) maunakea **de Laubenfels, 1936 Known only from Hawaii.**

1996 Legacy Project (Coles et al., 1997)

Mycale (Mycale) grandis **Gray, 1867 Introduced. Common name(s): Orange Keyhole Sponge.**

1996 Legacy Project (Coles et al., 1997) Recorded as Mycale armata
2007 Ref - Brock, 2007 Recorded as Mycale armata.

2007 This Project
2008 This Project

Mycale (Zygomycale) parishii **Bowerbank, 1875 Introduced.**
1947 Ref - de Laubenfels, 1950 Recorded as Zygomycale parishi.
1973 Ref - McCain, 1974 Recorded as Zygomycale parishi.
1973 Ref - McCain, 1975 Recorded as Zygomycale parishi.
1993 Ref - Brock, 1994 Recorded as Zygomycale parishi.
1994 Ref - Brock, 1995 Recorded as Zygomycale parishi.
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007 Recorded as Zygomycale parishii.
2008 This Project

Mycale phyllophila **Hentschel, 1911 New record for Hawaii. Cryptogenic.**
2008 This Project

Genus: *Stylinos*
Stylinos sp. **Indigenous. Common name(s): Orange Stylinos.**
2008 This Project

Family: MYXILLIDAE
Genus: *Tedania*
Tedania (Tedania) ignis **(Duchassaing & Michelotti, 1864) Cryptogenic. Common name(s): Fire Sponge.**
1973 Ref - McCain, 1974 Recorded as Tedania ignis.
1973 Ref - McCain, 1975 Recorded as Tedania ignis.
1993 Ref - Brock, 1994 Recorded as Tedania ignis.
1994 Ref - Brock, 1995 Recorded as Tedania ignis.
2007 Ref - Brock, 2007 Recorded as Tedania ignis.
2007 This Project
2008 This Project

Tedania macrodactyla **(Lamarck, 1814) Cryptogenic.**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Tedania reticulata **Thiele, 1903**
1996 Legacy Project (Coles et al., 1997)

Family: PHORBASIDAE
Genus: *Damiriana*
Damiriana hawaiiana **de Laubenfels, 1951**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Family: RASPAILIIDAE
Genus: *Echinodictyum*
Echinodictyum asperum **Ridley and Dendy, 1886 Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Genus: *Phycopsis*
Phycopsis aculeata **(Wilson)**
1973 Ref - Evans et al., 1974

Genus: *Raspailia*
Raspailia (Clathriodendron) darwinensis **Hooper, 1991 New record for Hawaii. Indigenous.**
2008 This Project

Legacy Project - Species Report (Cont.)

Order: HALICHONDRIDA
Family: HALICHONDRIIDAE
Genus: *Amorphinopsis*

Amorphinopsis n. sp. **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Genus: *Ciocalypta*

Ciocalypta sp. **Cryptogenic.**
1963 Spec - BPBM-C 196 Waiau; Hawaiian Electric Company condensers and tunnel outlets 3, 4, 5, 6.
2008 This Project

Ciocalypta sp. 1 **Indigenous.**
2008 This Project

Genus: *Halichondria*

Halichondria sp. **Indigenous.**
1963 Spec - BPBM-C 195 Waiau; Hawaiian Electric Company condensers and tunnel outlets 3, 4, 5, 6.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2007 This Project

Halichondria coerulea **Bergquist, 1967 Cryptogenic.**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2007 Ref - Brock, 2007

Halichondria dura **Lundgren, 1897**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Halichondria melanadocia **de Laubenfels, 1936 Introduced.**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007

Genus: *Topsentia*

Topsentia sp. **Indigenous.**
2008 This Project

Topsentia cf. halichondrioides **Dendy, 1905 Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Topsentia dura **Lindgren, 1897**
2007 Ref - Brock, 2007 Recorded as Halichondria dura.

Topsentia halichondrioides **(Dendy, 1905) New record for Hawaii. Cryptogenic.**
2007 This Project
2008 This Project

Family: HYMENIACIDONIDAE
Genus: *Hymeniacidon*

Hymeniacidon sp.
1973 Ref - Evans et al., 1974

Order: HADROMERIDA
Family: CLIONIDAE
Genus: *Cliona*

Cliona sp. **Introduced.**
1996 Legacy Project (Coles et al., 1997)

Cliona vastifica **Hancock, 1849**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Legacy Project - Species Report (Cont.)

Family: SPIRASTRELLIDAE
Genus: *Spirastrella*
Spirastrella coccinea **(Duchassaing & Michelotti, 1864)**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Family: SUBERITIDAE
Genus: *Prosuberites*
Prosuberites oleteira **de Laubenfels, 1957 Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Genus: *Pseudosuberites*
Pseudosuberites sp. **Indigenous.**
2008 This Project

Genus: *Suberites*
Suberites aurantiacus **(Duchassaing & Michelotti, 1864) Introduced.**
1948 Spec - BPBM-C 201
1978 Ref - Grovhoug, 1979 Recorded as Terpios zeteki.
1993 Ref - Brock, 1994 Recorded as Terpios zeteki.
1994 Ref - Brock, 1995 Recorded as Terpios zeteki.
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007 Recorded as Terpios zeteki.
2007 This Project
2008 This Project

Genus: *Terpios*
Terpios granulosa **Bergquist, 1967**
1993 Ref - Brock, 1994 Recorded as Terpios granuloma.
1994 Ref - Brock, 1995 Recorded as Terpios granuloma.

Order: CHORISTIDA
Family: CHONDROSIIDAE
Genus: *Chondrosia*
Chondrosia chucalla **de Laubenfels, 1936**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2007 Ref - Brock, 2007

Family: STELLETTIDAE
Genus: *Stelletta*
Stelletta n. sp. (cf. purpurea) **Ridley Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Phylum: CNIDARIA
Unidentified Cnidaria
1996 Legacy Project (Coles et al., 1997)

Family: AGARICIIDAE
Genus: *Leptoseris*
Leptoseris incrustans **(Quelch, 1886)**
2006 Ref - Smith et al., 2006

Genus: *Pavona*
Pavona varians **Verrill, 1864 Indigenous. Common name(s): Corrugated Coral.**
2006 Ref - Smith et al., 2006

Family: SIDERASTREIDAE
Genus: *Psammocora*
Psammocora explanulata **Van der Horst, 1922**
2006 Ref - Smith et al., 2006

Legacy Project - Species Report (Cont.)

Class: HYDROZOA

Unidentified Hydrozoa

1982	Spec - BPBM-D 753	Off Pearl Harbor.
1983	Spec - BPBM-D 971	Mamala Bay; Pearl Harbor disposal site.
1987	Ref - Brewer & Assoc., 1987	
1996	Legacy Project (Coles et al., 1997)	

Order: HYDROIDA

Unidentified Hydroida

1948	Spec - BPBM-D 283
1950	Spec - BPBM-D 307
1950	Spec - BPBM-D 308

Family: BOUGAINVILLIIDAE

Unidentified Bougainvilliidae

2007	This Project
2008	This Project

Genus: *Garveia*

Garveia humilis **(McCrady, 1856) Cryptogenic.**

1975	Ref - Grovhoug, 1976

Family: CAMPANULARIIDAE

Unidentified Campanulariidae

2008	This Project

Genus: *Clytia*

Clytia cf. gracilis **(M. Sars, 1850) New record for Hawaii. Cryptogenic.**

2007	This Project
2008	This Project

Clytia hemisphaerica **(Linnaeus, 1767) Introduced.**

1978	Ref - Grovhoug, 1979

Clytia latitheca **Millard and Bouillon, 1973 Cryptogenic.**

2008	This Project

Genus: *Obelia*

Obelia sp.

1972	Ref - Long, 1974	Off Pearl Harbor.

Obelia bidentata? **Introduced.**

1978	Ref - Grovhoug, 1979

Obelia dichotoma **(Linnaeus, 1758) Introduced.**

1975	Ref - Grovhoug, 1976
1978	Ref - Grovhoug, 1979
2007	This Project
2008	This Project

Family: CLAVIDAE

Genus: *Corydendrium*

Corydendrium parasiticum **(Linnaeus, 1767) New record for Hawaii. Cryptogenic.**

2008	This Project

Genus: *Turritopsis*

Turritopsis nutricula **(McCrady, 1856) Introduced.**

1975	Ref - Grovhoug, 1976

Family: HALECIIDAE

Genus: *Halecium*

Halecium sp. **Indigenous.**

2008	This Project

Legacy Project - Species Report (Cont.)

Halecium sp.? **Indigenous.**

1948	Spec - BPBM-D 288	Drydock #2.

Family: PENNARIIDAE

Genus: *Pennaria*

Pennaria disticha **(Goldfuss, 1820) Introduced. Common name(s): Christmas Tree Hydroid.**

1929	Spec - BPBM-D 183	
1943	Ref - Hutchins, 1949	Recorded as Pennaria sp..
1944	Spec - BPBM-D 250	Off Pearl Harbor.
1948	Spec - BPBM-D 289	Drydock #4.
1972	Ref - Long, 1974	Recorded as Pennaria tiarella McCrady.
1973	Ref - Evans et al., 1974	Recorded as Pennaria tiarella McCrady.
1978	Ref - Grovhoug, 1979	Recorded as Halocordyle disticha.
1986	Ref - Lenihan, 1990	Recorded as Pennaria tiarella.
1993	Ref - Brock, 1994	Recorded as Halocordyle disticha.
1994	Ref - Brock, 1995	Recorded as Halocordyle disticha.
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	Recorded as Halocardyle disticha.
2008	This Project	

Family: PLUMULARIIDAE

Unidentified Plumulariidae

1948	Spec - BPBM-D 290	Drydock #4.

Genus: *Plumularia*

Plumularia goodei? **Nutting, 1900**

1972	Ref - Long, 1974	Off Pearl Harbor.

Family: TUBULARIIDAE

Genus: *Tubularia*

Tubularia sp.

1978	Ref - Grovhoug, 1979	

Class: SCYPHOZOA

Unidentified Scyphozoa

1929	Spec - BPBM-D 240	
1982	Spec - BPBM-D 751	Off Pearl Harbor.

Order: SEMAEOSTOMEAE

Family: ULMARIDAE

Genus: *Aurelia*

Aurelia labiata? **Chamisso & Eysenhardt, 1820**

1973	Ref - Evans et al., 1974	Recorded as Balanus labiata.

Order: RHIZOSTOMEAE

Family: CASSIOPEIDAE

Genus: *Cassiopea*

Cassiopea medusa **Light, 1914 Introduced.**

1941	Ref - Doty, 1961	

Family: MASTIGIIDAE

Genus: *Phyllorhiza*

Phyllorhiza punctata **von Ledenfeld, 1884 Introduced.**

1941	Ref - Doty, 1961	Recorded as Cotylorhizoides pacificus.
1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	

Class: ANTHOZOA

Unidentified Anthozoa

1937	Spec - BPBM-D 227	
1948	Spec - BPBM-D 291	Drydock #4.

Legacy Project - Species Report (Cont.)

Genus: *Actiniaria*

Actiniaria **Indigenous.**

2008 This Project

Order: TELESTACEA

Family: TELESTIDAE

Genus: *Carijoa*

Carijoa aff. riisei **Duchassaing & Michelotti, 1860 Introduced. Common name(s): Snowflake Coral.**

1972	Spec - BPBM-D 454	Near channel buoy #11. Identified by Rees.
1973	Ref - Evans et al., 1974	Recorded as Telesto riisei.
1974	Ref - Cuttress, 1977	Recorded as Telesto riisei.
1978	Ref - Grovhoug, 1979	Recorded as Telesto riisei.
1986	Ref - Lenihan, 1990	Recorded as Telesto riisei.
1993	Ref - Brock, 1994	Recorded as Telesto riisei.
1994	Ref - Brock, 1995	Recorded as Telesto riisei.
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	Recorded as Telesto riisei.
2008	This Project	

Order: ALCYONACEA

Family: ALCYONIIDAE

Genus: *Anthomastus*

Anthomastus sp.

1982 Spec - BPBM-D 637 Off Pearl Harbor. Identified by D.M. Devaney, 21 April 1982.

Anthomastus fisheri **Bayer**

1982 Spec - BPBM-D 750 Off Pearl Harbor. Identified by D.M. Devaney.

Order: GORGONACEA

Unidentified Gorgonacea

1950	Spec - BPBM-D 309	
1950	Spec - BPBM-D 310	
1982	Spec - BPBM-D 752	Off Pearl Harbor.

Order: ZOANTHIDEA

Family: ZOANTHIDAE

Genus: *Protopalythoa*

Protopalythoa sp. **Indigenous.**

2008 This Project

Genus: *Zoanthus*

Zoanthus pacificus **Walsh & Bowers, 1971**

1993 Ref - Brock, 1994

1994 Ref - Brock, 1995

2007 Ref - Brock, 2007

Zoanthus sp. (white) **Indigenous. Common name(s): White Zoanthid.**

2007 This Project

2008 This Project

Order: ACTINIARIA

Family: ACTINIIDAE

Genus: *Cladactella*

Cladactella sp.

1973 Ref - Evans et al., 1974

Cladactella manni? **(Verrill, 1899)**

1979 Ref - AECOS, 1979 Off Pearl Harbor.

Family: AIPTASIIDAE

Genus: *Aiptasia*

Aiptasia pulchella **Carlgren, 1943 Indigenous. Common name(s): Glass Anemone.**

1978 Ref - Grovhoug, 1979

Legacy Project - Species Report (Cont.)

1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2008 This Project

Family: DIADUMENIDAE
Genus: *Diadumene*
Diadumene leucolena **(Verrill, 1866) Introduced.**
1977 Ref - Cuttress, 1977

Family: HORMATHIIDAE
Genus: *Calliactis*
Calliactis polypus? **(Forsskål, 1775)**
1973 Ref - Evans et al., 1974

Family: ISOPHELLIIDAE
Genus: *Epiphellia*
Epiphellia humilis **(Verrill, 1928)**
1973 Ref - Evans et al., 1974

Family: STOICHACTINIDAE
Genus: *Antheopsis*
Antheopsis papillosa **(Kwietniewski, 1898)**
1973 Ref - Evans et al., 1974 Recorded as Radianthus cookei (Verrill 1928).

Order: SCLERACTINIA
Family: ACROPORIDAE
Genus: *Montipora*
Montipora sp.
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Montipora capitata **(Dana, 1846) Indigenous. Common name(s): Rice Coral.**
2006 Ref - Smith et al., 2006
2008 This Project

Montipora flabellata **Studer, 1902**
2006 Ref - Smith et al., 2006

Montipora patula **Verrill, 1864 Indigenous. Common name(s): Sandpaper Rice Coral.**
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Family: DENDROPHYLLIIDAE
Genus: *Tubastraea*
Tubastraea sp.
1950 Spec - BPBM-SC 340 Pearl Harbor drydock.

Family: FAVIIDAE
Genus: *Leptastrea*
Leptastrea purpurea **Dana, 1846 Indigenous. Common name(s): Crust Coral.**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Legacy Project - Species Report (Cont.)

Family: FUNGIIDAE
Genus: *Fungia* **Common name(s): mushroom coral; Hawaiian name(s): ko`akohe; hu`ahu`a**

akai.

Fungia sp.
Unknown Spec - BPBM-SC 399

Family: POCILLOPORIDAE
Genus: *Pocillopora*
Pocillopora damicornis **Linnaeus, 1758** **Indigenous. Common name(s): Lace Coral; Hawaiian name(s): `ako`ako`a.**

1972 Ref - Long, 1974 Off Pearl Harbor. Recorded as Pocillopora cespitosa laysanensis Vaughan.
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Pocillopora ligulata
1904 Spec - BPBM-SC 142

Pocillopora meandrina **Dana, 1846** **Indigenous. Common name(s): Cauliflower Coral.**
1972 Ref - Long, 1974 Off Pearl Harbor.
1973 Ref - Evans et al., 1974 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Family: PORITIDAE
Genus: *Porites* **Hawaiian name(s): pokahu puna.**
Porites compressa **Dana, 1846** **Indigenous. Common name(s): Finger Coral; Hawaiian name(s): `ako`ako`a.**
1904 Spec - BPBM-SC 456 Outside Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Porites lobata **Dana, 1846** **Indigenous. Common name(s): Lobe Coral.**
2006 Ref - Smith et al., 2006

Phylum: CTENOPHORA
Class: TENTACULATA
Order: CYDIPPIDA
Family: PLEUROBRACHIIDAE
Genus: *Pleurobrachia*
Pleurobrachia sp.
1973 Ref - Evans et al., 1974

Phylum: PLATYHELMINTHES
Unidentified Platyhelminthes
1979 Ref - AECOS, 1979 Off Pearl Harbor. Black polyclad.
1996 Legacy Project (Coles et al., 1997)

Class: TURBELLARIA
Order: POLYCLADIDA
Family: PLANOCERIDAE
Genus: *Planocera*
Planocera sp.
1973 Ref - Evans et al., 1974

Class: CESTODA
Genus: *Tylocephalum*
Tylocephalum sp.
1965 Ref - Rifkin & Cheng, 1968

Legacy Project - Species Report (Cont.)

Phylum: NEMATODA
Unidentified Nematoda
1996 Legacy Project (Coles et al., 1997)

Phylum: ANNELIDA
Class: POLYCHAETA
Unidentified Polychaeta

1982	Spec - BPBM-R 1584	Pearl Harbor dredge spoil dumping site.
1982	Spec - BPBM-R 1585	Off Pearl Harbor; dredge spoil dumping site.
1982	Spec - BPBM-R 1586	Off Pearl Harbor; dredge spoil dumping site.

Family: AMPHINOMIDAE
Unidentified Amphinomidae
1978 Ref - Grovhoug, 1979

Genus: *Eurythoe*
Eurythoe complanata **(Pallas, 1776) Indigenous.**

1973	Ref - Evans et al., 1974	
1979	Ref - AECOS, 1979	Off Pearl Harbor.
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Family: APHRODITIDAE
Unidentified Aphroditidae
1978 Ref - Grovhoug, 1979

Family: ARABELLIDAE
Genus: *Arabella*
Arabella sp.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Arabella iridescens **Treadwell, 1906**
1973 Ref - Evans et al., 1974

Family: CAPITELLIDAE
Unidentified Capitellidae
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Genus: *Dasybranchus*
Dasybranchus lumbricoides **Grube, 1878**
1973 Ref - Evans et al., 1974

Family: CHAETOPTERIDAE
Unidentified Chaetopteridae
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Genus: *Chaetopterus*
Chaetopterus sp. **(Renier, 1804) Cryptogenic. Common name(s): Parchment Worm.**

1976	Ref - Grovhoug & Rastetter, 1980	Recorded as Chaetopterus variodoptecus.
1993	Ref - Brock, 1994	Recorded as C. variopedus.
1994	Ref - Brock, 1995	Recorded as C. variopedus.
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Chaetopterus variopedatus **Renier, 1804**
2007 Ref - Brock, 2007

Legacy Project - Species Report (Cont.)

Genus: *Phyllochaetopterus*
Phyllochaetopterus verrilli **Treadwell, 1943**
1973 Ref - Evans et al., 1974
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Family: CIRRATULIDAE
Unidentified Cirratulidae
1978 Ref - Grovhoug, 1979
2007 This Project
2008 This Project

Genus: *Cirratulus*
Cirratulus sp.
1929 Spec - BPBM-R 1451
1973 Ref - Evans et al., 1974

Genus: *Cirriformia*
Cirriformia sp. **Indigenous.**
1973 Ref - Evans et al., 1974
2008 This Project

Cirriformia hawaiensis **Hartman, 1956**
1966 Ref - Hartman, 1966
1973 Ref - Evans et al., 1974

Cirriformia punctata **(Grube, 1856)**
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1996 Legacy Project (Coles et al., 1997)

Family: COSSURIDAE
Unidentified Cossuridae
1978 Ref - Grovhoug, 1979

Family: DORVILLEIDAE
Unidentified Dorvilleidae
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Genus: *Dorvillea*
Dorvillea sp.
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Genus: *Schistomeringos*
Schistomeringos sp. **Indigenous.**
2008 This Project

Family: EUNICIDAE
Unidentified Eunicidae
1978 Ref - Grovhoug, 1979
2007 This Project
2008 This Project

Genus: *Eunice*
Eunice sp.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Eunice antennata **(Savigny, 1820) Indigenous.**
1973 Ref - Evans et al., 1974
2008 This Project

Legacy Project - Species Report (Cont.)

Eunice australis **Quatrefages, 1865**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Eunice cariboea **(Grube, 1856) Indigenous.**
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Eunice filamentosa **Grube, 1856**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Eunice vittata **(Delle Chiaje, 1828)**
1973 Ref - Evans et al., 1974

Genus: *Lysidice*
Lysidice ninetta **Audoin & Milne Edwards, 1833**
1973 Ref - Evans et al., 1974 Recorded as Lysidice collaris Grube, 1870.
1996 Legacy Project (Coles et al., 1997)

Genus: *Marphysa*
Marphysa sp. **Indigenous.**
1931 Spec - BPBM-R 1504 Identified by G. Tien.
1931 Spec - BPBM-R 1505 Identified by G. Tien.
1931 Spec - BPBM-R 1508 Identified by G. Tien.
2008 This Project

Marphysa corallina **Kinberg, 1865 Indigenous.**
2008 This Project

Marphysa sanguinea **(Montagu, 1815)**
1938 Spec - BPBM-R 1364 Identified by G. Tien.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Nematonereis*
Nematonereis unicornis **Schmarda, 1861 Indigenous.**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Genus: *Palola*
Palola siciliensis **Borradaile, 1898**
1973 Ref - Evans et al., 1974 Recorded as Eunice siciliensis.
1996 Legacy Project (Coles et al., 1997)

Genus: *Paramarphysa*
Paramarphysa sp.
1973 Ref - Evans et al., 1974

Family: GLYCERIDAE
Genus: *Glycera*
Glycera tesselata **Grube, 1863**
1996 Legacy Project (Coles et al., 1997)

Family: HESIONIDAE
Unidentified Hesionidae
1978 Ref - Grovhoug, 1979

Genus: *Syllidia*
Syllidia armata **Quatrefages, 1865**
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Family: LUMBRINERIDAE

Unidentified Lumbrineridae

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
2008	This Project	

Genus: *Lumbrineris*

Lumbrineris sp.

1996	Legacy Project (Coles et al., 1997)	

Lumbrineris dentata **Hartmann-Schroder, 1965 Indigenous.**

2008	This Project	

Family: LYSARETIDAE

Genus: *Oenone*

Oenone fulgida **(Savigny) Cryptogenic.**

1973	Ref - Evans et al., 1974	

Family: NEREIDIDAE

Unidentified Nereididae

1931	Spec - BPBM-R 1488	
1978	Ref - Grovhoug, 1979	Recorded as Nereidae.
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Genus: *Ceratonereis*

Ceratonereis sp.

1973	Ref - Evans et al., 1974	

Genus: *Laeonereis*

Laeonereis sp.

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	

Genus: *Leonnates*

Leonnates sp.

1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	

Genus: *Micronereis*

Micronereis sp.

1973	Ref - Evans et al., 1974	

Genus: *Nereis*

Nereis sp.

1973	Ref - Evans et al., 1974	
1987	Ref - Brewer & Assoc., 1987	

Nereis sp. 1

1973	Ref - McCain, 1974	Recorded as Nereis sp. 1.
1973	Ref - McCain, 1975	Recorded as Nereis sp. 1.

Nereis sp. 2

1973	Ref - McCain, 1974	Recorded as Nereis sp. 2.
1973	Ref - McCain, 1975	Recorded as Nereis sp. 2.

Nereis areanacoedonta **Moore, 1903 Introduced.**

1973	Ref - Evans et al., 1974	Recorded as Nereis (Neanthes) caudata (Delle Chiaje).

Nereis corallina **Kinberg, 1866**

1966	Ref - Hartman, 1966	

Legacy Project - Species Report (Cont.)

Genus: *Perinereis*
Perinereis sp.
1929 Spec - BPBM-R 1502 Identified by G. Tien.
1973 Ref - Evans et al., 1974
1987 Ref - Brewer & Assoc., 1987

Perinereis cultifera floridana **Iwajima, 1972**
1973 Ref - Evans et al., 1974 Recorded as Perinereis cultrifera.

Genus: *Platynereis*
Platynereis sp.
1973 Ref - Evans et al., 1974

Family: ONUPHIDAE
Genus: *Diopatra*
Diopatra sp.
1973 Ref - Evans et al., 1974

Family: OPHELIIDAE
Unidentified Opheliidae
1978 Ref - Grovhoug, 1979

Genus: *Armandia*
Armandia sp.
1996 Legacy Project (Coles et al., 1997)

Family: ORBINIIDAE
Unidentified Orbiniidae
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Family: PARAONIDAE
Unidentified Paraonidae
1978 Ref - Grovhoug, 1979

Family: PHYLLODOCIDAE
Unidentified Phyllodocidae
1978 Ref - Grovhoug, 1979
2007 This Project
2008 This Project

Genus: *Eulalia*
Eulalia sp.
1996 Legacy Project (Coles et al., 1997)

Eulalia sanguinea **Oersted, 1843**
1966 Ref - Hartman, 1966
1996 Legacy Project (Coles et al., 1997)

Genus: *Eumida*
Eumida sanguinea **(Oested, 1843)**
1966 Ref - Hartman, 1966

Unidentified Eumida
1996 Legacy Project (Coles et al., 1997)

Genus: *Phyllodoce*
Phyllodoce sp.
1996 Legacy Project (Coles et al., 1997)

Family: POLYNOIDAE
Unidentified Polynoidae
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Hololepidella*
Hololepidella nigropunctata **(Horst, 1915)**
1972 Spec - BPBM-R 563 Harbor entrance, from buoy "1". Identified by D.M. Devaney.

Genus: *Iphione*
Iphione muricata **(Savigny, 1818)**
1973 Ref - Evans et al., 1974

Genus: *Paralepidonotus*
Paralepidonotus ampulliferus **(Grube, 1878)**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Family: SABELLARIIDAE
Unidentified Sabellariidae
1978 Ref - Grovhoug, 1979

Family: SABELLIDAE
Unidentified Sabellidae
1972 Ref - Long, 1974 Off Pearl Harbor.
1978 Ref - Grovhoug, 1979
1979 Ref - AECOS, 1979 Off Pearl Harbor.
2007 This Project
2008 This Project

Genus: *Amphiglena*
Amphiglena sp. **Cryptogenic.**
2008 This Project

Amphiglena mediterranea **(Leydig, 1851) Cryptogenic.**
2008 This Project

Genus: *Branchiomma*
Branchiomma nigromaculata **(Baird, 1865) Cryptogenic.**
1966 Ref - Hartman, 1966:235
1975 Ref - Grovhoug, 1976 Recorded as Branchiomma cingulata.
1976 Ref - Cooke et al., 1980 Recorded as B. cingulata.
1976 Ref - Grovhoug & Rastetter, 1980 Recorded as Branchiomma cingulata.
1986 Ref - Henderson, 1990 Arizona Memorial.
1986 Ref - Lenihan, 1990 Recorded as B. cingualata.
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Genus: *Demonax*
Demonax sp. **Indigenous.**
2008 This Project

Demonax leucaspis **Kinberg, 1867**
1975 Ref - Grovhoug, 1976
1976 Ref - Cooke et al., 1980

Genus: *Potamethus*
Potamethus sp. **Indigenous.**
2008 This Project

Genus: *Potamilla*
Potamilla sp. **Indigenous.**
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Legacy Project - Species Report (Cont.)

Genus: *Sabella*

Sabella sp.

1973	Ref - Evans et al., 1974	

Genus: *Sabellastarte*

Sabellastarte indica **(Savigny, 1818) Indigenous.**

2007	This Project	
2008	This Project	

Sabellastarte spectabilis **(Grube, 1878) Introduced. Common name(s): Feather Duster Worm.**

1976	Ref - Grovhoug & Rastetter, 1980	Recorded as Sabellastarte sanctijosephi.
1979	Ref - AECOS, 1979	Off Pearl Harbor. Recorded as Sabellastarte sanctijosephi.
1980	Ref - Grovhoug & Rastetter, 1980	Recorded as Sabellastarte sanctijosephi.
1986	Ref - Lenihan, 1990	Recorded as Sabellastarte sanctijosephi.
1987	Ref - AECOS, 1987	Recorded as Sabellastarte sanctijosephi.
1993	Ref - Brock, 1994	Recorded as Sabellastarte sanctijosephi.
1994	Ref - Brock, 1995	Recorded as Sabellastarte sanctijosephi.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	Ref - Brock, 2007	
2007	This Project	
2008	This Project	

Family: SERPULIDAE

Unidentified Serpulidae

1978	Ref - Grovhoug, 1979	
1979	Ref - AECOS, 1979	Off Pearl Harbor.
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Genus: *Ficopomatus*

Ficopomatus enigmaticus **(Fauvel, 1923) Introduced.**

1937	Spec - BPBM-R 1330	
1937	Ref - Straughan, 1969	Recorded as Mercierella sp..
1973	Ref - Evans et al., 1974	Recorded as Mercierella sp..
1976	Ref - Bailey-Brock, 1976	

Genus: *Hydroides*

Hydroides sp. **Indigenous.**

1937	Spec - BPBM-R 1235	Identified by D. Straughan.
1938	Spec - BPBM-R 1238	Identified by D. Straughan.
1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1987	Ref - Brewer & Assoc., 1987	
2007	This Project	
2008	This Project	

Hydroides brachyacantha **Rioja, 1941 Introduced.**

2008	This Project	

Hydroides crucigera **(Morch, 1863) Introduced.**

1937	Ref - Straughan, 1969	
1938	Ref - Straughan, 1969	
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	
2008	This Project	

Hydroides dirampha **(Morch, 1863) Introduced.**

1929	Spec - BPBM-R 1083	
1929	Ref - Straughan, 1969	Recorded as H. lunulifera (Claparede, 1868).
1935	Ref - Edmondson, 1944	Recorded as H. lunulifera (Claparede, 1868).

Legacy Project - Species Report (Cont.)

1935	Ref - Ingram, 1937	Recorded as H. lunulifera.
1937	Spec - BPBM-R 1089	
1937	Spec - BPBM-R 1090	
1937	Spec - BPBM-R 1093	
1937	Spec - BPBM-R 1231	Identified by D. Straughan.
1937	Ref - Straughan, 1969	Recorded as H. lunulifera (Claparede, 1868).
1938	Spec - BPBM-R 1094	
1938	Spec - BPBM-R 1095	
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	Recorded as H. lunulifera (Claparede, 1868).
1973	Ref - McCain, 1974	Recorded as H. lunilifera.
1973	Ref - McCain, 1975	Recorded as H. lunilifera.
1975	Ref - Grovhoug, 1976	Recorded as Hydroides norvegica Gunnerus, 1768.
1976	Ref - Cooke et al., 1980	Recorded as H. lunulifera (Claparede, 1868).
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Hydroides elegans **(Haswell, 1883) Introduced.**

1929	Spec - BPBM-R 1101	Identified by D. Straughan.
1929	Ref - Straughan, 1969	Recorded as H. norvegica Gunnerus, 1768.
1935	Ref - Edmondson, 1944	Recorded as H. norvegica Gunnerus, 1768.
1935	Ref - Ingram, 1937	Recorded as H. norvegica Gunnerus, 1768.
1937	Spec - BPBM-R 1108	
1937	Spec - BPBM-R 1120	Identified by D. Straughan.
1938	Spec - BPBM-R 1109	
1938	Spec - BPBM-R 1110	
1938	Spec - BPBM-R 1111	
1938	Spec - BPBM-R 1113	
1938	Spec - BPBM-R 1114	
1940	Spec - BPBM-R 1115	
1940	Spec - BPBM-R 1366	Identified by D. Straughan.
1941	Spec - BPBM-R 1122	Identified by D. Straughan.
1947	Spec - BPBM-R 1123	Identified by D. Straughan.
1948	Spec - BPBM-R 1118	
1948	Spec - BPBM-R 1121	Identified by D. Straughan.
1972	Ref - Long, 1974	Recorded as H. norvegica Gunnerus, 1768.
1973	Ref - Evans et al., 1974	Recorded as H. norvegica Gunnerus, 1768.
1973	Ref - McCain, 1974	Recorded as H. norvegica.
1973	Ref - McCain, 1975	Recorded as H. norvegica.
1975	Ref - Grovhoug, 1976	Recorded as Hydroides norvegica Gunnerus, 1768.
1976	Ref - Cooke et al., 1980	
1978	Ref - Grovhoug, 1979	
1985	Ref - Hurlbut, 1990	
1987	Ref - Brewer & Assoc., 1987	
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Hydroides sanctaecrucis **Morch, 1863**

1972	Ref - Long, 1974	Off Pearl Harbor.

Hydroides uncinata **Phillipe, 1844**

1972	Ref - Long, 1974	

Genus: *Neodexiospira*

Neodexiospira foraminosa **(Moore & Bush, 1904) Introduced.**

1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	

Legacy Project - Species Report (Cont.)

Genus: ***Pileolaria***

Pileolaria militaris **Claparede, 1868 Introduced.**

2008 This Project

Pileolaria semimilitaris **Vine, 1972**

1975 Ref - Grovhoug, 1976

Genus: ***Pomatoleios***

Pomatoleios kraussii **(Baird, 1865) Introduced.**

1976 Ref - Grovhoug & Rastetter, 1980
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2008 This Project

Genus: ***Salmacina***

Salmacina dysteri **Huxley, 1855 Introduced. Common name(s): Sea Frost.**

1972 Ref - Long, 1974
1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Genus: ***Serpula***

Serpula sp. **Indigenous.**

2008 This Project

Serpula vermicularis **Linnaeus, 1767 Cryptogenic.**

1938 Ref - Straughan, 1969
1940 Ref - Straughan, 1969
1948 Ref - Straughan, 1969
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Genus: ***Simplicaria***

Simplicaria pseudomilitaris **(Thirèot-Quièvreux, 1965) Cryptogenic.**

1996 Legacy Project (Coles et al., 1997)
2008 This Project

Genus: ***Spirobranchus***

Spirobranchus tricornis **Morch, 1863**

1972 Ref - Long, 1974 Off Pearl Harbor.

Genus: ***Spirorbis***

Spirorbis sp.

1973 Ref - Evans et al., 1974
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Genus: ***Vermiliopsis***

Vermiliopsis torquata **Treadwell, 1943**

1937 Spec - BPBM-R 1317 Identified by D. Straughan.

Family: SPINTHERIDAE

Genus: ***Spinther***

Spinther japonicus **Iwajima & Hartman, 1964 Cryptogenic.**

1976 Ref - Grovhoug & Rastetter, 1980

1987 Ref - Bailey-Brock & Hartman, 1987
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: SPIONIDAE

Unidentified Spionidae

1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Genus: *Polydora*

Polydora websteri **Hartman, 1943 Introduced.**

1966 Ref - Hartman, 1966

Genus: *Streblospio*

Streblospio benedicti **Webster, 1879 Introduced.**

1987 Ref - Ward, 1987

Family: SPIRORBIDAE

Unidentified Spirorbidae

1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: SYLLIDAE

Unidentified Syllidae

1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Genus: *Autolytus*

Autolytus sp.

1996 Legacy Project (Coles et al., 1997)

Genus: *Branchiosyllis*

Branchiosyllis exilis **(Gravier, 1900)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Brania*

Brania rhopalophora **(Ehlers, 1897)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Exogone*

Exogone verugera **(Claparède, 1869)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Haplosyllis*

Haplosyllis spongicola **(Grube, 1855)**

1973 Ref - Evans et al., 1974 Recorded as Syllis spongicola.
1996 Legacy Project (Coles et al., 1997)

Genus: *Langerhansia*

Langerhansia cornuta **(Rathke, 1843)**

1973 Ref - Evans et al., 1974 Recorded as Syllis cornuta.
1996 Legacy Project (Coles et al., 1997)

Genus: *Myrianida*

Myrianida crassicirrata

1996 Legacy Project (Coles et al., 1997)

Genus: *Opisthosyllis*

Opisthosyllis sp.

1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Genus: *Syllis*

Syllis sp.
1973 Ref - Evans et al., 1974

Syllis gracilis
1996 Legacy Project (Coles et al., 1997)

Typosyllis variegata **(Grube, 1860)**
1973 Ref - Evans et al., 1974 Recorded as Syllis variegata.

Genus: *Trypanosyllis*

Trypanosyllis sp. **Indigenous.**
2008 This Project

Trypanosyllis zebra **(Grube, 1860)**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Typosyllis*

Typosyllis sp.
1996 Legacy Project (Coles et al., 1997)

Typosyllis hawaiiensis **Hartmann-Schrödeer, 1965**
1996 Legacy Project (Coles et al., 1997)

Typosyllis hyalina **(Grube, 1863)**
1996 Legacy Project (Coles et al., 1997)

Typosyllis prolifera
1996 Legacy Project (Coles et al., 1997)

Family: TEREBELLIDAE

Unidentified Terebellidae
1978 Ref - Grovhoug, 1979
2007 This Project
2008 This Project

Genus: *Loimia*

Loimia medusa **(Savigny, 1818) Indigenous. Common name(s): Medusa Spaghettti Worm; Hawaiian name(s): kauna‘oa.**
2007 This Project
2008 This Project

Genus: *Thelepus*

Thelepus setosus **(Quatrefages, 1865) Indigenous.**
1973 Ref - Evans et al., 1974
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project

Class: OLIGOCHAETA

Order: RHYNCHOBDELLIDA

Family: PISCICOLIDAE

Unidentified Piscicolidae
1973 Ref - Evans et al., 1974

Phylum: MOLLUSCA

Unidentified Mollusca
1914 Spec - BPBM-MO 65001 Ford Island. Catalogue V.
1917 Spec - BPBM-MO 18 Off Pearl Harbor.
1922 Spec - BPBM-MO 37

Legacy Project - Species Report (Cont.)

1934 Spec - BPBM-MO 205580 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205581 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205584 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205585 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205586 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205587 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205588 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205591 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205592 Dredge. Catalogue XIV.
1947 Spec - BPBM-MO 41 Bottom of ship Jacona.
1947 Spec - BPBM-MO 42 Bottom of ship Jacona.
1947 Spec - BPBM-MO 47 Bottom of ship Jacona.
1947 Spec - BPBM-MO 61 Drydock, hull of ship Jacona.
1948 Spec - BPBM-MO 44 Drydock.
1948 Spec - BPBM-MO 59 Hull of Barge YC-1024, Dry Dock #3..
1950 Spec - BPBM-MO 5 Power House intake tunnel..
1950 Spec - BPBM-MO 56 U.S.S. Deal.
1950 Spec - BPBM-MO 66

Family: APLYSIIDAE
Unidentified Aplysiidae
2008 This Project

Genus: *Tambja*
Tambja morosa **(Bergh, 1877) Indigenous. Common name(s): Gloomy Nudibranch.**
2008 This Project

Family: CUSPIDARIIDAE
Genus: *Cuspidaria*
Cuspidaria sp. **Indigenous.**
2008 This Project

Cuspidaria hawaiensis **Dall, Bartsch, and Rehder, 1938 Indigenous. Common name(s): Noble Vermitid.**
2007 This Project
2008 This Project

Family: MESODESMATIDAE
Genus: *Rochefortina*
Rochefortina sandwichensis **Hayami & Kase, 1993 Indigenous.**
2008 This Project

Class: GASTROPODA
Family: CAECIDAE
Genus: *Caecum*
Caecum sepimentum **de Folin, 1867**
1996 Legacy Project (Coles et al., 1997)

Family: CEPHALASPIDAE
Unidentified Cephalaspidae
1996 Legacy Project (Coles et al., 1997)

Family: DIALIDAE
Genus: *Cerithidium*
Cerithidium perparvulum **(Watson, 1886)**
1973 Ref - Evans et al., 1974 Recorded as Obtortio perparvulum.
1996 Legacy Project (Coles et al., 1997)

Genus: *Diala*
Diala semistriata
1973 Ref - Evans et al., 1974 Recorded as Diala varia.

Diala varia **A. Adams, 1861**
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Family: EATONIELLIDAE
Genus: *Eatoniella*
Eatoniella sp.
1996 Legacy Project (Coles et al., 1997)

Order: ARCHAEOGASTROPODA
Family: FISSURELLIDAE
Unidentified Fissurellidae
2008 This Project

Genus: *Diodora*
Diodora sp. **Indigenous.**
2008 This Project

Diodora granifera **(Pease, 1861) Hawaiian name(s): `opihi.**
Unknown Spec - BPBM-MO 225792 Opposite Ford Island on Railroad Wharf on Peninsula. Catalogue XVI.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Diodora octagona **(Reeve, 1850) Indigenous. Common name(s): Sea Frost.**
2008 This Project

Diodora octogona **Reeve, 1850**
1996 Legacy Project (Coles et al., 1997)

Diodora ruppelli **(Sowerby, 1834) Introduced.**
1962 Ref - Kay, 1979
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: NERITIDAE
Genus: *Nerita*
Nerita sp.
1932 Spec - BPBM-MO 199261 Catalogue XIV.

Nerita picea **Recluz, 1841 Indigenous. Common name(s): Black Nerite; Hawaiian name(s): pipipi kai;**
pipipi; pipipi; pipipi.
1912 Spec - BPBM-MO 64253 Catalogue V.
1912 Spec - BPBM-MO 64264 Catalogue V.
1923 Spec - BPBM-MO 228140 Along shore near Railroad Wharf opposite Ford Island. Catalogue XVI.
1930 Spec - BPBM-MO 195621 Catalogue XIV.
1930 Spec - BPBM-MO 195622 Pearl Locks, Peninsula. Catalogue XIV.
1930 Spec - BPBM-MO 195623 Pearl Locks, Peninsula. Catalogue XIV.
1930 Spec - BPBM-MO 195624 Pearl Locks, Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 198798 Fishpond wall on Eastern side of Pearl City Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 198800 Fishpond wall on Eastern side of Pearl City Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 198801 Pearl City Peninsula, shore along Cobb's place. Catalogue XIV.
2008 This Project

Genus: *Theodoxus*
Theodoxus cariosa **Gray Known only from Hawaii.**
1912 Spec - BPBM-MO 64294 Catalogue V.

Theodoxus kanaka **Pilsbry**
1912 Spec - BPBM-MO 64313 Catalogue V.

Theodoxus neglectus **Pease, 1861**
1932 Spec - BPBM-MO 198799 Fishpond wall on Eastern side of Pearl City Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 198802 Pearl City Peninsula, shore along Cobb's place. Catalogue XIV.

Family: PATELLIDAE
Genus: *Cellana* **Hawaiian name(s): ka`ala; ko`ele; `opihi kapua`i lio.**
Cellana sp.
1934 Spec - BPBM-MO 205577 Dredge. Catalogue XIV.

1950 Spec - BPBM-MO 55
1973 Ref - Evans et al., 1974

Family: PHASIANELLIDAE
Genus: *Tricolia*
Tricolia variabilis **(Pease, 1861) Hawaiian name(s): pupu kanaloa.**
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Family: PHENACOLEPADIDAE
Genus: *Phenacolepas*
Phenacolepas sp.
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Family: SCISSURELLIDAE
Genus: *Scissurella*
Scissurella sp.
1973 Ref - Evans et al., 1974

Family: SKENEIDAE
Genus: *Lophocaclias*
Lophocaclias minutissimus **(Pilsbry, 1921)**
1973 Ref - Evans et al., 1974 Off Pearl Harbor. Recorded as Cyclostremiscus minutissimus (Pilsbry, 1921).

Family: STOMATELLIDAE
Genus: *Syncera*
Syncera giffardi **Dall**
Unknown Spec - BPBM-MO 65725 Pearl City. Catalogue V.

Family: TROCHIDAE
Genus: *Danilia*
Danilia eucheliformis **(Nomura & Hatai, 1940)**
1961 Spec - BPBM-MO 217634 Off Fort Kamehameha. Catalogue XV.

Genus: *Euchelus*
Euchelus gemmatus **Gould, 1845**
1973 Ref - Evans et al., 1974

Genus: *Tholotia*
Tholotia subangulata **(Pease, 1861)**
1917 Ref - Pilsbry, 1917 Recorded as Alcyna lineata Pease, 1861. MCZ 31724.

Genus: *Trochus*
Trochus sp.
1934 Spec - BPBM-MO 205576 Dredge. Catalogue XIV.

Trochus histrio **Reeve**
1973 Ref - Evans et al., 1974

Trochus intextus **Kiener, 1850 Hawaiian name(s): pupu o Ha`upu; ha`upu; haupu; `okole `oi `oi; pupu o Haupu.**
Unknown Spec - BPBM-MO 200688 Catalogue XIV.
Unknown Spec - BPBM-MO 227198 Catalogue XVI.
1918 Spec - BPBM-MO 198674 Catalogue XIV.
1918 Spec - BPBM-MO 198675 Catalogue XIV.
1923 Spec - BPBM-MO 227202 Catalogue XVI.
1924 Spec - BPBM-MO 240750 Catalogue XVII.
1930 Spec - BPBM-MO 195331 Pearl Locks Peninsula, makai face of little pier just mauka of Dr. Whitney's place.. Catalogue XIV.
1932 Spec - BPBM-MO 198940 Eastside of Pearl City Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 198941 Peninsula; Railroad Wharf. Catalogue XIV.
1932 Spec - BPBM-MO 198942 End of Waipio Peninsula. Catalogue XIV.
1932 Spec - BPBM-MO 200036 Pearl Harbor channel. Catalogue XIV.
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Family: TURBINIDAE

Genus: *Leptothyra*

Leptothyra candida **(Pease, 1861)**

1973	Ref - Evans et al., 1974	Off Pearl Harbor.
1996	Legacy Project (Coles et al., 1997)	

Leptothyra rubricincta **(Mighels, 1845) Hawaiian name(s): Kahelelani eilaula; Kahelelani `okala.**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	

Genus: *Turbo*

Turbo chrysostomus

Unknown	Spec - BPBM-MO 200698	Catalogue XIV.

Turbo sandwicensis **Menke, 1846**

Unknown	Spec - BPBM-MO 200699	Catalogue XIV.
Unknown	Spec - BPBM-MO 64380	Catalogue V.

Order: MESOGASTROPODA

Family: ARCHITECTONICIDAE

Genus: *Architectonica*

Architectonica sp.

1934	Spec - BPBM-MO 205570	Dredge. Catalogue XIV.

Architectonica perspectiva **(Linnaeus, 1758) Common name(s): Sundial shell; Hawaiian name(s): pupu puhi.**

1906	Spec - BPBM-MO 217662	Off Fort Kamehameha. Catalogue XV.

Genus: *Heliacus*

Heliacus sp.

1973	Ref - Evans et al., 1974	

Genus: *Philippia*

Philippia sp.

Unknown	Spec - BPBM-MO 220737	Off Fort Kamehameha. Catalogue XV.

Family: BARLEEIIDAE

Genus: *Barleeia*

Barleeia sp.

Unknown	Spec - BPBM-MO 230902	Pearl City. Catalogue XVI.

Family: BURSIDAE

Genus: *Bursa*

Bursa cruentata **Sowerby, 1841**

1950	Spec - BPBM-MO 233988	Fort Kamehameha reef. Catalogue XVI.

Bursa granularis **Röding, 1798**

1932	Spec - BPBM-MO 199149	Reef off Fort Kamehameha. Catalogue XIV.

Family: CALYPTRAEIDAE

Genus: *Crepidula*

Crepidula sp.

1932	Spec - BPBM-MO 200164	Waipio Peninsula, end. Catalogue XIV.
1932	Spec - BPBM-MO 200185	Peninsula; Railroad Wharf. Catalogue XIV.
1932	Spec - BPBM-MO 201516	Pearl City Peninsula, Railroad Wharf. Catalogue XIV.
2007	Ref - Brock, 2007	Recorded as Crepidula sp..

Crepidula aculeata **(Gmelin, 1791) Introduced. Common name(s): Hoof Shell.**

Unknown	Spec - BPBM-MO 64006	Catalogue V.
Unknown	Spec - BPBM-MO 64798	Ford Island. Catalogue V.
1915	Spec - BPBM-MO 231366	Ford Island. Catalogue XVI.
1923	Spec - BPBM-MO 231368	At Railroad Wharf, opposite Ford Island, Peninsula. Catalogue XVI.
1950	Spec - BPBM-MO 231370	Fort Kamehameha reef. Catalogue XVI.
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	

1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1975 Ref - Grovhoug, 1976
1978 Ref - Grovhoug, 1979
1987 Ref - Brewer & Assoc., 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Genus: *Crucibulum*
Crucibulum spinosum **(Sowerby, 1824) Indigenous.**
1950 Spec - BPBM-MO 231372 Fort Kamehameha. Catalogue XVI.
1950 Spec - BPBM-MO 76 Reef at Fort Kamehameha.
1972 Ref - Long, 1974
1973 Ref - Evans et al., 1974
1993 Ref - Brock, 1994 Recorded as Calyptraea spinosum.
1994 Ref - Brock, 1995 Recorded as Calyptraea spinosum.
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Family: CAPULIDAE
Genus: *Capulus*
Capulus bicarinatus **Pease**
Unknown Spec - BPBM-MO 65647 Catalogue V.
1922 Spec - BPBM-MO 77

Family: CASSIDIDAE
Genus: *Casmaria*
Casmaria vibex
1961 Spec - BPBM-MO 218261 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 218262 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 218263 Off Fort Kamehameha. Catalogue XV.

Genus: *Cassis*
Cassis viber
1932 Spec - BPBM-MO 200430 Channel entrance, seaward. Catalogue XIV.

Genus: *Phalium*
Phalium (Semicassis) umbilicatum **(Pease, 1861)**
1961 Spec - BPBM-MO 218248 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 218249 Off Fort Kamehameha. Catalogue XV.

Family: CERITHIIDAE
Unidentified Cerithiidae
Unknown Spec - BPBM-MO 229571 Dredged in entrance channel to Pearl Harbor. Catalogue XVI.

Genus: *Bittium*
Bittium impendens **(Hedley, 1899)**
1973 Ref - Evans et al., 1974

Bittium manti **Dall**
Unknown Spec - BPBM-MO 65642 Catalogue V.

Bittium parcum **(Gould, 1861)**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Bittium zebrum **(Kiener, 1841)**
Unknown Spec - BPBM-MO 229462 Catalogue XVI.
1923 Spec - BPBM-MO 229463 At Railroad Wharf on Peninsula opposite Ford Island. Catalogue XVI.
1973 Ref - Evans et al., 1974

1996 Legacy Project (Coles et al., 1997)

Genus: *Cerithiopsis*

Cerithiopsis sp. A

1973 Ref - Evans et al., 1974 Recorded as Cerithiopsis sp. A.
1996 Legacy Project (Coles et al., 1997)

Cerithiopsis sp. B

1973 Ref - Evans et al., 1974 Recorded as Cerithiopsis sp. B.

Cerithiopsis acaria sp.

Unknown Spec - BPBM-MO 65649 Catalogue V.

Cerithiopsis acaria sp.?

1934 Spec - BPBM-MO 205561 Dredge. Catalogue XIV.

Genus: *Cerithium*

Cerithium articulatus

1961 Spec - BPBM-MO 217761 Off Fort Kamehameha?. Catalogue XV.

Cerithium diminutirum **Phil.**

Unknown Spec - BPBM-MO 63339 Ford Island. Catalogue V.

Cerithium locticum **Pease**

Unknown Spec - BPBM-MO 63176 Catalogue V.
Unknown Spec - BPBM-MO 63229 Ford Island. Catalogue V.

Cerithium matukense **Watson, 1886**

1961 Spec - BPBM-MO 217694 Off Pearl Harbor. Catalogue XV.
1982 Spec - BPBM-MO 207403 Catalogue XIV.

Cerithium nesioticum **Pilsbry & Vanatta, 1905 Hawaiian name(s): pupu maka`aha; maka`aha.**

1973 Ref - Evans et al., 1974

Cerithium zebrum **Kiener, 1841 Indigenous.**

2008 This Project

Genus: *Finella*

Finella pupoides **A. Adams, 1860**

Unknown Spec - BPBM-MO 229372 Catalogue XVI.
1996 Legacy Project (Coles et al., 1997)

Genus: *Rhinoclavis*

Rhinoclavis fasciata **Bruguiere**

1961 Spec - BPBM-MO 217848 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 217849 Off Fort Kamehameha?. Catalogue XV.

Family: CERITHIOPSIDAE

Unidentified Cerithiopsidae

Unknown Spec - BPBM-MO 230301 Catalogue XVI.

Family: CYMATIIDAE

Genus: *Cymatium*

Cymatium sp. **Indigenous.**

1934 Spec - BPBM-MO 205568 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205569 Dredge. Catalogue XIV.
1973 Ref - Evans et al., 1974
2008 This Project

Cymatium aquatile **Reeve, 1844**

1927 Spec - BPBM-MO 240863 Entrance Channel. Catalogue XVII.
1936 Spec - BPBM-MO 240862 Reef off Fort Kamehameha. Catalogue XVII.
1961 Spec - BPBM-MO 218307 Off Fort Kamehameha. Catalogue XV.

Cymatium gemmatum **Reeve, 1844**

Unknown Spec - BPBM-MO 249233 Catalogue XVII.
1927 Spec - BPBM-MO 69 Naval Station.

Legacy Project - Species Report (Cont.)

1928	Spec - BPBM-MO 240865	Reef off Fort Kamehameha. Catalogue XVII.
1936	Spec - BPBM-MO 233927	Reef at Fort Kamehameha. Catalogue XVI.
1996	Legacy Project (Coles et al., 1997)	

Cymatium intermedius **Pease, 1869**

Unknown	Spec - BPBM-MO 240869	Catalogue XVII.
Unknown	Spec - BPBM-MO 240872	Catalogue XVII.
1927	Spec - BPBM-MO 240868	Entrance Channel off Fort Kamehameha. Catalogue XVII.
1936	Spec - BPBM-MO 233764	Reefs at Fort Kamehameha. Catalogue XVI.
1936	Spec - BPBM-MO 240866	Reef off Fort Kamehameha. Catalogue XVII.
1936	Spec - BPBM-MO 240867	Reef off Fort Kamehameha, under loose coral blocks. Catalogue XVII.
1996	Legacy Project (Coles et al., 1997)	

Cymatium muricinum **Röding, 1798** **Hawaiian name(s): pupu `ole kiwi; naunau; `anaunau.**

Unknown	Spec - BPBM-MO 240859	Catalogue XVII.
1915	Spec - BPBM-MO 233908	Ford Island. Catalogue XVI.
1923	Spec - BPBM-MO 233913	Ewa side, near entrance. Catalogue XVI.
1927	Spec - BPBM-MO 233974	Naval Station. Catalogue XVI.
1932	Spec - BPBM-MO 198709	Naval Station, Hospital Pt.. Catalogue XIV.
1932	Spec - BPBM-MO 198710	Railroad Wharf. Catalogue XIV.
1932	Spec - BPBM-MO 198711	Watertown. Catalogue XIV.
1932	Spec - BPBM-MO 198712	Pearl Harbor channel, at Watertown. Catalogue XIV.
1936	Spec - BPBM-MO 233919	Reefs at Fort Kamehameha. Catalogue XVI.

Cymatium nicobaricum **(Röding, 1798)**

1932	Spec - BPBM-MO 199158	Fort Kamehameha. Catalogue XIV.
1961	Spec - BPBM-MO 218320	Off Fort Kamehameha. Catalogue XV.
1996	Legacy Project (Coles et al., 1997)	

Cymatium pileare **Linnaeus, 1758**

1932	Spec - BPBM-MO 198718	Pearl Harbor entrance Channel, off Fort Kamehameha. Catalogue XIV.
1932	Spec - BPBM-MO 198719	Reef off Fort Kamehameha. Catalogue XIV.
1932	Spec - BPBM-MO 198726	Naval Station, Hospital Point. Catalogue XIV.
1932	Spec - BPBM-MO 198728	Watertown. Catalogue XIV.
1932	Spec - BPBM-MO 199880	Watertown, Pear Harbor Channel. Catalogue XIV.
1932	Spec - BPBM-MO 199950	Pearl City Peninsula, Railroad Wharf. Catalogue XIV.
1932	Spec - BPBM-MO 199951	Waipio Peninsula, end. Catalogue XIV.
1961	Spec - BPBM-MO 218337	Off Fort Kamehameha. Catalogue XV.

Cymatium rubeculum **(Linnaeus, 1758)**

1932	Spec - BPBM-MO 200063	Fort Kamehameha, reef. Catalogue XIV.
1932	Spec - BPBM-MO 200065	Pearl Harbor Channel; Watertown. Catalogue XIV.
1936	Spec - BPBM-MO 240875	Reef off Fort Kamehameha, under loose coral blocks. Catalogue XVII.
1936	Spec - BPBM-MO 70	Reefs at Fort Kamahameha.
1973	Ref - Evans et al., 1974	

Genus: *Distorsio*

Distorsio sp.

1934	Spec - BPBM-MO 205565	Dredge. Catalogue XIV.

Genus: *Gyrineum*

Gyrineum pusillum **Broderip**

1936	Spec - BPBM-MO 233981	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.
1936	Spec - BPBM-MO 71	Reef at Fort Kamehameha.
1961	Spec - BPBM-MO 218370	Off Fort Kamehameha. Catalogue XV.

Genus: *Triton*

Triton tuberosus **Lamarck**

Unknown	Spec - BPBM-MO 62157	Catalogue V.

Legacy Project - Species Report (Cont.)

Family: CYPRAEIDAE

Genus: *Cypraea* **Hawaiian name(s): leho; leholeho; leho `oma`o.**

Cypraea sp. **Indigenous.**

1934	Spec - BPBM-MO 215701	Dredgings. Catalogue XV.
1934	Spec - BPBM-MO 215704	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215705	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215706	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215707	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215708	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215709	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215710	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215711	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215712	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215713	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215714	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215715	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215716	Dredging. Catalogue XV.
1934	Spec - BPBM-MO 215717	Dredging. Catalogue XV.

Cypraea alisonae **Burgess, 1983**

Unknown	Spec - BPBM-MO 247888	Fort Kamehameha. Catalogue XVII.
1982	Spec - BPBM-MO 9953	Fort Kamehameha, 4ft under large coral slab. Catalogue I.

Cypraea arabica **(Linnaeus, 1758)**

1976	Ref - Burgess, 1995	Off Pearl Harbor.

Cypraea caputserpentis **Linnaeus, 1758 Hawaiian name(s): leho kupa; leho maoli.**

1932	Spec - BPBM-MO 196399	Fort Kamehameha. Catalogue XIV.
1932	Spec - BPBM-MO 197104	Fort Kamehameha, reef off. Catalogue XIV.
1932	Spec - BPBM-MO 197112	End of Waipio Peninsula. Catalogue XIV.
1939	Spec - BPBM-MO 246606	Pearl City T.H.. Catalogue XVII.
1957	Spec - BPBM-MO 246610	Fort Kaahamaha (Fort Kamehameha). Catalogue XVII.

Cypraea carneola **Linnaeus, 1758 Indigenous. Hawaiian name(s): leho pauhu.**

1932	Spec - BPBM-MO 197216	Pearl Harbor channel. Catalogue XIV.
1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea childreni **Gray, 1825**

1996	Legacy Project (Coles et al., 1997)	

Cypraea chinensis **Gmelin, 1791**

1932	Spec - BPBM-MO 198042	Pearl Harbor channel, Watertown. Catalogue XIV.

Cypraea clandestina **Linnaeus, 1767 Introduced.**

1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea cribaria **Linnaeus, 1758 Introduced.**

1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea cylindrica **Born Introduced.**

1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea depressa **Grey, 1825 Introduced.**

1991	Ref - Burgess, 1995	Off Pearl Harbor.

Cypraea fimbriata **Gmelin, 1791**

1932	Spec - BPBM-MO 197303	Fort Kamehameha; along edge of channel. Catalogue XIV.
1936	Spec - BPBM-MO 231689	Reefs at Fort Kamehameha. Catalogue XVI.
1957	Spec - BPBM-MO 247674	Fort Kamehameha. Catalogue XVII.

Cypraea gaskoini **Reeve, 1846**

Unknown	Spec - BPBM-MO 247840	Pearl City. Catalogue XVII.

Cypraea gaspardi **Biraghi & Nicolay, 1993 Introduced.**

1993	Ref - Burgess, 1995	Off Pearl Harbor.

Legacy Project - Species Report (Cont.)

Cypraea helvola **Linnaeus, 1758 Indigenous. Hawaiian name(s): leho `opule.**

Unknown	Spec - BPBM-MO 231763	Entrance. Catalogue XVI.
1932	Spec - BPBM-MO 197225	Pearl Harbor Channel; Watertown. Catalogue XIV.
1936	Spec - BPBM-MO 231768	Reefs at Fort Kamehameha. Catalogue XVI.
1939	Spec - BPBM-MO 246957	Catalogue XVII.
1958	Spec - BPBM-MO 246958	Catalogue XVII.
1960	Spec - BPBM-MO 246923	Fort Kamehameha. Catalogue XVII.

Cypraea hirundo **Linnaeus, 1758 Introduced.**

1993	Ref - Burgess, 1995	Off Pearl Harbor.

Cypraea isabella **Linnaeus, 1758 Indigenous. Common name(s): Isabella Cowry; Hawaiian name(s): puleho; puleho holei; puleho kani`o; puleholeho; puleho palaoa; puleho `ula; puleholeho; leho kupe`e lima; momi ke`oke`o.**

1932	Spec - BPBM-MO 197271	Pearl Harbor Channel; Watertown. Catalogue XIV.
1932	Spec - BPBM-MO 197272	Pearl Harbor entrance channel. Catalogue XIV.
1932	Spec - BPBM-MO 197273	Fort Kamehameha; along edge of channel. Catalogue XIV.
1936	Spec - BPBM-MO 231793	Reef at Fort Kamehameha. Catalogue XVI.
1957	Spec - BPBM-MO 246270	Fort Kamehameha. Catalogue XVII.

Cypraea labrolineata **Gaskoin, 1849 Indigenous.**

1993	Ref - Burgess, 1995	Off Pearl Harbor.

Cypraea maculifera **Shilder, 1932 Hawaiian name(s): kuoho; leho; leho kolea.**

1957	Spec - BPBM-MO 246540	Fort Kaahamaha (Fort Kamehameha). Catalogue XVII.

Cypraea moneta **Linnaeus, 1758 Hawaiian name(s): leho palaoa; leho puna; leho `uala; `uwala; pupu leholeho.**

Unknown	Spec - BPBM-MO 231864	At Naval Station. Catalogue XVI.
Unknown	Spec - BPBM-MO 240815	Catalogue XVII.
1932	Spec - BPBM-MO 197205	Fort Kamehameha, about 150 ft. S.E. of the Ft. Kam. Wharf, 100 ft. from shore. Catalogue XIV.

Cypraea poraria **Linnaeus, 1758 Introduced.**

1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea reticulata **Martyn**

1916	Spec - BPBM-MO 67	Reef Waikiki of entrance to Pearl Harbor.
1932	Spec - BPBM-MO 196358	Reef off Fort Kamehameha. Catalogue XIV.

Cypraea scurra **Gmelin, 1791**

1932	Spec - BPBM-MO 198044	Keahi Point. Catalogue XIV.

Cypraea semiplota **Mighels, 1845 Hawaiian name(s): puleholeho.**

1926	Spec - BPBM-MO 231883	Fort Kamehameha reef. Catalogue XVI.
1926	Spec - BPBM-MO 231884	Fort Kamehameha reef. Catalogue XVI.
1932	Spec - BPBM-MO 198045	Fort Kamehameha. Catalogue XIV.

Cypraea shilderorum

1932	Spec - BPBM-MO 197146	Pearl Harbor Channel; Watertown. Catalogue XIV.

Cypraea staphylaea **Linnaeus, 1758**

1939	Spec - BPBM-MO 247051	Pearl City T.H.. Catalogue XVII.
1939	Spec - BPBM-MO 247052	Pearl City T.H.. Catalogue XVII.
1950	Ref - Burgess, 1959	Off Pearl Harbor.

Cypraea sulcidentata **Gray, 1824**

1932	Spec - BPBM-MO 197173	Fort Kamehameha, reef off. Catalogue XIV.

Cypraea talpa **Linnaeus, 1758**

1928	Spec - BPBM-MO 240832	Reef off Fort Kamehameha, under loose coral blocks. Catalogue XVII.
1932	Spec - BPBM-MO 197277	Fort Kamehameha, off. Catalogue XIV.
1932	Spec - BPBM-MO 198046	Pearl Harbor channel. Catalogue XIV.
1936	Spec - BPBM-MO 60	Reef at Fort Kamehameha.

Cypraea teres **Gmelin, 1791**

1932	Spec - BPBM-MO 197286	Fort Kamehameha; along edge of channel. Catalogue XIV.
1932	Spec - BPBM-MO 198043	Pearl Harbor channel, Watertown. Catalogue XIV.
1936	Spec - BPBM-MO 68	Reef at Fort Kamehameha.
1954	Spec - BPBM-MO 246850	Fort Kamehamaha reef. Catalogue XVII.
1957	Spec - BPBM-MO 246865	Fort Kaahamaha (Fort Kamehameha). Catalogue XVII.
1961	Spec - BPBM-MO 218101	Off Fort Kamehameha. Catalogue XV.

Cypraea tessellata **Swainson, 1822**

1932	Spec - BPBM-MO 197197	Keahi Point. Catalogue XIV.
1932	Spec - BPBM-MO 198047	Pearl Harbor channel. Catalogue XIV.

Family: DIASTOMIDAE

Genus: *Alaba*

Alaba goniochila **(A. Adams, 1860)**

1973	Ref - Evans et al., 1974	Off Pearl Harbor.

Genus: *Alabina*

Alabina pearlensis **Dall**

Unknown	Spec - BPBM-MO 65635	Catalogue V.

Genus: *Obtortio*

Obtortio fulva **Watson**

1973	Ref - Evans et al., 1974	

Family: EULIMIDAE

Genus: *Balcis*

Balcis sp. **Indigenous.**

1976	Ref - Cooke et al., 1980	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Balcis thaanumi **Pilsbry, 1917**

1936	Spec - BPBM-MO 230613	Reef at Fort Kamehameha. Catalogue XVI.

Genus: *Leiostraca*

Leiostraca sp.

1973	Ref - Evans et al., 1974	

Family: HIPPONICIDAE

Genus: *Amalthea*

Amalthea sp. **(?W.H.)**

1930	Spec - BPBM-MO 195332	Pearl Locks Peninsula, makai face of little pier just mauka of Dr. Whitney's place.. Catalogue XIV.
1932	Spec - BPBM-MO 200163	Waipio Peninsula, end. Catalogue XIV.

Amalthea barbatus

1932	Spec - BPBM-MO 200171	Fort Kamehameha and Barber's Point, beach between. Catalogue XIV.

Genus: *Antisabia*

Antisabia foliacea

Unknown	Spec - BPBM-MO 209902	Fort Kamehameha Army Housing (S.C.) 910509AS. Catalogue XIV.

Genus: *Hipponix*

Hipponix sp.

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	

Hipponix (Cochlear) imbricatus **Gould, 1846 Indigenous. Common name(s): Hoof Shell.**

Unknown	Spec - BPBM-MO 64817	Catalogue V.

Hipponix (Pilosabia) pilosus **(Deshayes, 1832) Indigenous.**

2008	This Project	

Hipponix australis

1961	Spec - BPBM-MO 217888	Off Fort Kamehameha. Catalogue XV.

Hipponix foliaceous **Quoy & Gaimard, 1835**

1930	Spec - BPBM-MO 196836	Peninsula. Catalogue XIV.

Hipponix grayanus

1961	Spec - BPBM-MO 217892	Off Fort Kamehameha. Catalogue XV.

Hipponix imbricatus **Gould, 1846**

Unknown	Spec - BPBM-MO 204603	Catalogue XIV.
Unknown	Spec - BPBM-MO 63956	Ford Island. Catalogue V.
1927	Spec - BPBM-MO 231294	Ford Island, on pearl oyster, along shore, on rocks. Catalogue XVI.
1949	Spec - BPBM-MO 231301	Fort Kamehameha. Catalogue XVI.
1996	Legacy Project (Coles et al., 1997)	

Hipponix pilosus **(Deshayes, 1832)**

1973	Ref - Evans et al., 1974	
1979	Ref - AECOS, 1979	Off Pearl Harbor. Recorded as Hipponyx cf. barbatus.
1996	Legacy Project (Coles et al., 1997)	

Family: LITTORINIDAE

Genus: *Littoraria* **Common name(s): Periwinkle; Hawaiian name(s): pupu kolea.**

Littoraria coccinea **(Gmelin, 1791)**

1930	Spec - BPBM-MO 196989	Peninsular, Pearl Lochs, N. of Dr. Whitney's place. Catalogue XIV.

Littoraria intermedia

1930	Spec - BPBM-MO 196735	S.E. coast of peninsular Pearl Lochs. Catalogue XIV.
1930	Spec - BPBM-MO 196745	Pearl Lochs. Catalogue XIV.

Littoraria pintado **(Wood, 1828) Indigenous.**

1996	Legacy Project (Coles et al., 1997)	

Littoraria scabra **(Linnaeus, 1758) Indigenous. Common name(s): Feather Duster Worm; Hawaiian name(s): kukae kolea; pupu kolea; kolealea; pipipi kolea.**

Unknown	Spec - BPBM-MO 204655	Ford Island. Catalogue XIV.
Unknown	Spec - BPBM-MO 63606	Catalogue V.
Unknown	Spec - BPBM-MO 63608	Catalogue V.
Unknown	Spec - BPBM-MO 64830	Catalogue V.
1915	Spec - BPBM-MO 228535	Ford Island. Catalogue XVI.
1923	Spec - BPBM-MO 228540	Peninsula; sea wall at Dowsett's Wharf. Catalogue XVI.
1923	Spec - BPBM-MO 228541	Peninsula; along shore near Railroad Wharf. Catalogue XVI.
1930	Spec - BPBM-MO 196741	Peninsular Pearl Lochs, North of Dr. Whitney's place. Catalogue XIV.
1930	Spec - BPBM-MO 197004	Peninsular, Pearl Lochs. Catalogue XIV.
1930	Spec - BPBM-MO 197005	Peninsular, Pearl Lochs. Catalogue XIV.
1930	Spec - BPBM-MO 197006	Peninsular, Pearl Lochs. Catalogue XIV.
1932	Spec - BPBM-MO 200143	Peninsula. Catalogue XIV.
1973	Ref - Evans et al., 1974	Recorded as Littorina scabra.
1993	Ref - Brock, 1994	Recorded as Littorina scabra.
1994	Ref - Brock, 1995	Recorded as Littorina scabra.
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	Recorded as Littorina scabra.
2008	This Project	

Family: MODULIDAE

Genus: *Modulus*

Modulus sp.

1934	Spec - BPBM-MO 205575	Dredge. Catalogue XIV.

Modulus tectum **Gmelin Hawaiian name(s): pupu.**

1932	Spec - BPBM-MO 199280	Reef off Fort Kamehameha. Catalogue XIV.

Family: NATICIDAE

Genus: *Natica*

Natica sp.

1961	Spec - BPBM-MO 218130	Off Fort Kamehameha. Catalogue XV.

Legacy Project - Species Report (Cont.)

1973 Ref - Evans et al., 1974

Natica gualteriana **Recluz, 1844** **Hawaiian name(s): pupu kui; kio noho one.**
1915 Spec - BPBM-MO 64034 Catalogue V.
1932 Spec - BPBM-MO 199329 Reef off Fort Kamehameha. Catalogue XIV.
1932 Spec - BPBM-MO 199336 Entrance Channel. Catalogue XIV.
1932 Spec - BPBM-MO 199337 Pearl City. Catalogue XIV.
1973 Ref - Evans et al., 1974

Natica tessellata
1961 Spec - BPBM-MO 218143 Off Fort Kamehameha. Catalogue XV.

Genus: *Polinices*
Polinices sp.
1934 Spec - BPBM-MO 205566 Dredge. Catalogue XIV.
1961 Spec - BPBM-MO 218188 Off Fort Kamehameha. Catalogue XV.
1962 Spec - BPBM-MO 218195 Just Ewa of restricted area. Catalogue XV.

Family: RISSOELLIDAE
Genus: *Rissoella*
Rissoella sp.
1973 Ref - Evans et al., 1974

Family: RISSOIDAE
Genus: *Cithna*
Cithna sp.
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Genus: *Merelina*
Merelina sp.
1973 Ref - Evans et al., 1974

Genus: *Parashiela*
Parashiela beetsi **Ladd, 1966**
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Genus: *Pusillina*
Pusillina marmorata **Ponder, 1985** **Indigenous.**
2008 This Project

Genus: *Rissoina*
Rissoina ambigua **(Gould, 1849)**
1973 Ref - Evans et al., 1974

Rissoina cerithiiformis **Tryon, 1887** **Indigenous.**
2008 This Project

Rissoina miltozona **Tomlin, 1915**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Rissoina rhyssa **Dall**
Unknown Spec - BPBM-MO 228923 Catalogue XVI.
Unknown Spec - BPBM-MO 65714 Catalogue V.

Rissoina turricula **Pease, 1861**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Schwartziella*
Schwartziella gracilis **(Pease, 1861)**
1973 Ref - Evans et al., 1974 Recorded as Rissoina gracilis.

Genus: *Zebina*
Zebina tridentata **(Michaud, 1830)**
Unknown Spec - BPBM-MO 63855 Catalogue V.

1973 Ref - Evans et al., 1974 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Family: STROMBIDAE

Genus: *Strombus*

Strombus dentatus **(Linnaeus, 1758)**
1961 Spec - BPBM-MO 217932 Off Fort Kamehameha. Catalogue XV.

Strombus helli **Kiener, 1843**
1961 Spec - BPBM-MO 217953 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 217954 Off Fort Kamehameha. Catalogue XV.

Strombus maculatus **Sowerby, 1842 Hawaiian name(s): mamaiki; pupu mamaiki; pu leholeho.**
1932 Spec - BPBM-MO 199101 Reef off Fort Kamehameha. Catalogue XIV.

Family: TONNIDAE

Genus: *Tonna* **Hawaiian name(s): pu`oni`oni`o.**

Tonna perdix **Linnaeus, 1758 Hawaiian name(s): puleho.**
1936 Spec - BPBM-MO 240897 Reef off Fort Kamehameha. Catalogue XVII.

Family: TRIPHORIDAE

Genus: *Triforis*

Triforis flammulata **Pease**
Unknown Spec - BPBM-MO 62886 Ford Island. Catalogue V.

Genus: *Triphora*

Triphora {Triphoridae}
1932 Spec - BPBM-MO 198048 Pearl Harbor entrance channel. Catalogue XIV.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Viriola*

Viriola incisa **Pease, 1861**
1936 Spec - BPBM-MO 230149 E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Family: VERMETIDAE

Unidentified Vermetidae
Unknown Spec - BPBM-MO 229146 Catalogue XVI.
Unknown Spec - BPBM-MO 51
Unknown Spec - BPBM-MO 65695 Catalogue V.
1934 Spec - BPBM-MO 205562 Dredge. Catalogue XIV.
1948 Spec - BPBM-MO 43 Bottom of portable dry dock in Dry Dock #4..
1978 Ref - Grovhoug, 1979
2008 This Project

Genus: *Dendropoma*

Dendropoma sp.
1972 Ref - Long, 1974
1996 Legacy Project (Coles et al., 1997)

Dendropoma platypus **Morch, 1861**
1973 Ref - Evans et al., 1974
1987 Ref - Brewer & Assoc., 1987

Dendropoma psarocephala **Hadfield & Kay, 1972**
1975 Ref - Grovhoug, 1976

Dendropoma psarocephala? **Hadfield & Kay, 1972**
1973 Ref - Evans et al., 1974

Genus: *Eualetes*

Eualetes tulipa **(Chenu, 1843) Introduced. Common name(s): Noble Vermitid.**
1973 Ref - Evans et al., 1974 Recorded as Vermetus alii.
1975 Ref - Grovhoug, 1976 Recorded as Vermetus alii.
1986 Ref - Lenihan, 1990 Recorded as Vermetus alii.

1993	Ref - Brock, 1994	Recorded as Vermetus alii.
1994	Ref - Brock, 1995	Recorded as Vermetus alii.
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	Recorded as Vermetus alii.
2007	This Project	
2008	This Project	

Genus: *Petaloconchus*

Petaloconchus keenae **Hadfield and Kay, 1972 Indigenous. Common name(s): Periwinkle.**

2007	This Project	
2008	This Project	

Genus: *Serpulorbis*

Serpulorbis variabilis **Hadfield and Kay, 1972 Indigenous.**

2007	This Project	
2008	This Project	

Genus: *Vermetus* **Hawaiian name(s): pohokupele; kauno`a.**

Vermetus sp.

Unknown	Spec - BPBM-MO 63578	Catalogue V.
1973	Ref - Evans et al., 1974	

Family: VITRINELLIDAE

Genus: *Cyclostremiscus*

Cyclostremiscus sp. A

1973	Ref - Evans et al., 1974	Off Pearl Harbor. Recorded as Cyclostremiscus sp. A.

Cyclostremiscus sp. B

1973	Ref - Evans et al., 1974	Off Pearl Harbor. Recorded as Cyclostremiscus sp. B.

Cyclostremiscus sp. C

1973	Ref - Evans et al., 1974	Off Pearl Harbor. Recorded as Cyclostremiscus sp. C.

Cyclostremiscus sp. D

1973	Ref - Evans et al., 1974	Off Pearl Harbor. Recorded as Cyclostremiscus sp. D.

Cyclostremiscus emeryi **Ladd, 1966**

1973	Ref - Evans et al., 1974	Off Pearl Harbor.

Family: XENOPHORIDAE

Genus: *Xenophora*

Xenophora pallida

1961	Spec - BPBM-MO 217922	Off Fort Kamehameha. Catalogue XV.

Order: NEOGASTROPODA

Family: BUCCINIDAE

Genus: *Cantharus*

Cantharus farinosus **(Gould, 1850)**

1973	Ref - Evans et al., 1974	

Genus: *Colubraria*

Colubraria obscura **Reeve, 1844**

Unknown	Spec - BPBM-MO 240920	Channel. Catalogue XVII.

Genus: *Engina*

Engina sp.

1973	Ref - Evans et al., 1974	

Genus: *Prodotia*

Prodotia ignea **Gmelin, 1791**

Unknown	Spec - BPBM-MO 235895	Catalogue XVI.
Unknown	Spec - BPBM-MO 65702	Catalogue V.
1928	Spec - BPBM-MO 240939	Reef off Fort Kamehameha. Catalogue XVII.
1932	Spec - BPBM-MO 199738	Fort Kamehameha, reef off. Catalogue XIV.

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Prodotia iostomus
1932 Spec - BPBM-MO 199731 Fort Kamehameha, reef off. Catalogue XIV.

Family: COLUMBELLIDAE

Genus: *Anachis*
Anachis miser **(Sowerby, 1844)**
1973 Ref - Evans et al., 1974 Recorded as A. zebra.

Genus: *Columbella* **Hawaiian name(s): pupu Ni`ihau.**
Columbella varians **Sowerby**
1932 Spec - BPBM-MO 199827 Fort Kamehameha, reef off. Catalogue XIV.

Genus: *Euplica*
Euplica varians
1996 Legacy Project (Coles et al., 1997)

Genus: *Mitrella*
Mitrella margarita **Reeve, 1859**
1961 Spec - BPBM-MO 221163 Off Fort Kamehameha?. Catalogue XV.

Genus: *Seminella*
Seminella sp.
1996 Legacy Project (Coles et al., 1997)

Family: CONIDAE

Genus: *Conus* **Common name(s): Cone shell; Hawaiian name(s): pupu`ala; pupu poniuniu.**
Conus sp.
1961 Spec - BPBM-MO 220384 Off Fort Kamehameha. Catalogue XV.

Conus abbreviatus **Reeve, 1843**
1932 Spec - BPBM-MO 199015 Fort Kamehameha. Catalogue XIV.

Conus acutangulus **Lamarck, 1810**
1961 Spec - BPBM-MO 220118 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 220119 Off Fort Kamehameha. Catalogue XV.

Conus catus **Hwass, 1792**
1932 Spec - BPBM-MO 198911 Reef off Fort Kamehameha. Catalogue XIV.
1936 Spec - BPBM-MO 238941 Fort Kamehameha. Catalogue XVI.

Conus clavus **Linnaeus**
1929 Spec - BPBM-MO 63 Brought up by dredger opperations in entrance to Pearl Harbor.

Conus dactylasus **Kiener**
1929 Spec - BPBM-MO 64 Brought up by dredger opperations in entrance to Pearl Harbor.

Conus ebraeus **Linnaeus, 1758 Hawaiian name(s): ohana o ka pupu`ala; ke`oke`o; `ele`ele.**
1932 Spec - BPBM-MO 199614 Fort Kamehameha. Catalogue XIV.

Conus eugrammatus **Bartsch and Rehder, 1943 Indigenous.**
2008 This Project

Conus flavidus **Lamarck, 1810**
1932 Spec - BPBM-MO 199052 Fort Kamehameha. Catalogue XIV.

Conus lividus **Hwass, 1792**
1932 Spec - BPBM-MO 198981 Fort Kamehameha. Catalogue XIV.

Conus marmoreus **Linnaeus, 1758**
1932 Spec - BPBM-MO 200269 Pearl Harbor channel; entrance, near seaward end. Catalogue XIV.

Conus miles **Linnaeus, 1758 Indigenous. Common name(s): Soldier Cone.**
1932 Spec - BPBM-MO 199134 Fort Kamehameha, near outer edge of the reef. Catalogue XIV.
1932 Spec - BPBM-MO 199135 Reef off Fort Kamehameha. Catalogue XIV.
1936 Spec - BPBM-MO 2 Off Fort Kamehameha, on the reef.
1936 Spec - BPBM-MO 239251 Off Fort Kamehameha, on the reef. Catalogue XVI.

Conus nussatella **Linnaeus, 1758**

1927	Spec - BPBM-MO 241003	Off Fort Kamehameha, under loose, dead coral. Catalogue XVII.
1936	Spec - BPBM-MO 239257	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.
1936	Spec - BPBM-MO 62	Reef at Fort Kamehameha.

Conus pennaccus

Unknown	Spec - BPBM-MO 239602	Catalogue XVI.
1932	Spec - BPBM-MO 199642	Watertown. Catalogue XIV.
1932	Spec - BPBM-MO 200257	Fort Kamehameha, reef. Catalogue XIV.

Conus quercinus **Lightfoot, 1786**

1932	Spec - BPBM-MO 199691	Pearl Harbor Channel; Watertown. Catalogue XIV.
1961	Spec - BPBM-MO 220303	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 220304	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 220305	Off Fort Kamehameha. Catalogue XV.

Conus rattus **Hwass, 1792**

1932	Spec - BPBM-MO 199084	Fort Kamehameha. Catalogue XIV.

Conus sponsalis **Hass in Brugière, 1792**

1932	Spec - BPBM-MO 199201	Reef off Fort Kamehameha. Catalogue XIV.

Conus textile **Linnaeus, 1758**

1915	Spec - BPBM-MO 239129	Reef Waikiki of entrance to Pearl Harbor, under a rock in five feet of water. Catalogue XVI.
1936	Spec - BPBM-MO 65	Fort Kamehameha Reef.

Conus vexillum **Gmelin, 1791**

1932	Spec - BPBM-MO 199346	Reef off Fort Kamehameha. Catalogue XIV.
1932	Spec - BPBM-MO 199347	Fort Kamehameha. Catalogue XIV.

Conus vitulinus **Hwass, 1792**

1932	Spec - BPBM-MO 199673	Fort Kamehameha, reef off. Catalogue XIV.
1932	Spec - BPBM-MO 199674	Fort Kamehameha. Catalogue XIV.
1936	Spec - BPBM-MO 239424	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.
1936	Spec - BPBM-MO 52	Reef at Fort Kamehameha.

Family: CORALLIOPHILIDAE

Genus: *Quoyula*

Quoyula madreporarum **Sowerby, 1834**

1932	Spec - BPBM-MO 198765	Reef off Fort Kamehameha. Catalogue XIV.

Family: FASCIOLARIIDAE

Genus: *Fusinus*

Fusinus sp.

1934	Spec - BPBM-MO 205567	Dredge. Catalogue XIV.
1961	Spec - BPBM-MO 218747	Off Fort Kamehameha, Station 2. Catalogue XV.

Fusinus sandvicensis **Saverly**

1934	Spec - BPBM-MO 215733	West Lock, Dredging. Catalogue XV.
1940	Spec - BPBM-MO 249147	Dredging. Catalogue XVII.

Genus: *Fusolatirus*

Fusolatirus kuroseanus?

1961	Spec - BPBM-MO 222218	Off Fort Kamehameha. Catalogue XV.

Genus: *Peristernia*

Peristernia chlorostoma **(Sowerby, 1825) Hawaiian name(s): kolealea.**

Unknown	Spec - BPBM-MO 204253	Catalogue XIV.
Unknown	Spec - BPBM-MO 240953	Catalogue XVII.
1923	Spec - BPBM-MO 237440	At Railroad Wharf. Catalogue XVI.
1923	Spec - BPBM-MO 237442	Near inside entrance to Pearl Harbor. Catalogue XVI.
1924	Spec - BPBM-MO 237447	At Naval Station. Catalogue XVI.
1932	Spec - BPBM-MO 198883	Fort Kamehameha. Catalogue XIV.

1932 Spec - BPBM-MO 198891 Peninsula; Railroad Wharf. Catalogue XIV.
1932 Spec - BPBM-MO 198892 End of Waipio Peninsula. Catalogue XIV.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Family: MAGILIDAE

Genus: *Coralliophila*

Coralliophila d'orbignyana **Petit**

1932 Spec - BPBM-MO 198738 Reef off Fort Kamehameha. Catalogue XIV.
1936 Spec - BPBM-MO 235759 E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Coralliophila violacea **Kiener, 1836**

1928 Spec - BPBM-MO 240915 Reef off Fort Kamehameha. Catalogue XVII.
1932 Spec - BPBM-MO 198753 Reef off Fort Kamehameha. Catalogue XIV.

Unidentified Coralliophila erosa **(Röding, 1798)**

1932 Spec - BPBM-MO 198732 Reef off Fort Kamehameha. Catalogue XIV.

Family: MARGINELLIDAE

Genus: *Cystiscus*

Cystiscus sp.

1973 Ref - Evans et al., 1974

Genus: *Granula*

Granula sandwicensis **(Pease, 1860) Hawaiian name(s): pupu `aha`aha.**

1973 Ref - Evans et al., 1974 Recorded as Kogomea sandwicensis (Pease).

Genus: *Marginella*

Marginella sp. a-1

Unknown Spec - BPBM-MO 61271 Catalogue V.

Family: MITRIDAE

Genus: *Cancilla*

Cancilla granatina **Lamarck, 1811**

1961 Spec - BPBM-MO 219301 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 219302 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 219303 Off Fort Kamehameha. Catalogue XV.

Genus: *Imbricaria*

Imbricaria punctata **Swainson, 1821**

1961 Spec - BPBM-MO 219471 Off Fort Kamehameha. Catalogue XV.

Genus: *Mitra*

Mitra sp. **Indigenous.**

1973 Ref - Evans et al., 1974
2008 This Project

Mitra assimilis **Reeve, 1868**

1932 Spec - BPBM-MO 199442 Fort Kamehameha. Catalogue XIV.

Mitra brunnea **Pease, 1861**

1915 Spec - BPBM-MO 6 Fort Kamahameha.

Mitra litterata **Lamarck, 1811**

1936 Spec - BPBM-MO 238093 E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Mitra mitra **Linnaeus, 1758**

1961 Spec - BPBM-MO 219381 Off Fort Kamehameha. Catalogue XV.

Mitra pellisserpentis **Reeve, 1844**

1932 Spec - BPBM-MO 199367 Fort Kamehameha. Catalogue XIV.
1932 Spec - BPBM-MO 199470 Fort Kamehameha, reef off. Catalogue XIV.
1936 Spec - BPBM-MO 238107 E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Mitra ticaonica **Reeve, 1844**

1932 Spec - BPBM-MO 199503 Fort Kamehameha, reef off. Catalogue XIV.

Legacy Project - Species Report (Cont.)

Genus: *Neocancilla*

Neocancilla waikikiensis **Pilsbry, 1921**

1961	Spec - BPBM-MO 219594	Off Fort Kamehameha. Catalogue XV.

Genus: *Scabricola*

Scabricola newcombii **Pease, 1869**

1961	Spec - BPBM-MO 219413	Off Fort Kamehameha. Catalogue XV.

Genus: *Subcancilla*

Subcancilla flammea **(Quoy & Gaimard, 1833)**

1982	Spec - BPBM-MO 242714	Entrance to west. Catalogue XVII.

Genus: *Vexillum*

Vexillum (Pusia) lautum **(Reeve, 1845)**

1932	Spec - BPBM-MO 199456	Fort Kamehameha, reef off. Catalogue XIV.

Vexillum alveolus **Reeve, 1845**

1938	Spec - BPBM-MO 12	Fossil near Yacht Club.

Vexillum bellum **Pease, 1860**

1962	Spec - BPBM-MO 219200	Off Fort Kamehameha. Catalogue XV.

Vexillum filistriatum **(Sowerby, 1874)**

1982	Spec - BPBM-MO 243097	Entrance to west. Catalogue XVII.

Vexillum pacificum **Reeve**

1961	Spec - BPBM-MO 219231	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 219232	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 219233	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 219234	Off Fort Kamehameha. Catalogue XV.

Family: MURICIDAE

Genus: *Aspella*

Aspella producta **(Pease, 1861)**

1932	Spec - BPBM-MO 200760	Fort Kamehameha, reef off. Catalogue XIV.
1973	Ref - Evans et al., 1974	

Genus: *Chicoreus*

Chicoreus insularum **(Pilsbry, 1921)**

1961	Spec - BPBM-MO 218423	Off Fort Kamehameha. Catalogue XV.

Genus: *Drupella*

Drupella elata **Blainville, 1832**

1932	Spec - BPBM-MO 198217	Fort Kamehameha. Catalogue XIV.
1961	Spec - BPBM-MO 218493	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 218494	Off Fort Kamehameha. Catalogue XV.

Genus: *Morula*

Morula sp.

1932	Spec - BPBM-MO 198193	End of Waipio Peninsula. Catalogue XIV.
1932	Spec - BPBM-MO 198194	End of Waipio Peninsula. Catalogue XIV.
1932	Spec - BPBM-MO 198196	Peninsula; Railroad Wharf. Catalogue XIV.
1932	Spec - BPBM-MO 198197	Peninsula; Railroad Wharf. Catalogue XIV.

Morula dermosa

1932	Spec - BPBM-MO 198253	Fort Kamehameha. Catalogue XIV.
1932	Spec - BPBM-MO 198254	Fort Kamehameha. Catalogue XIV.
1996	Legacy Project (Coles et al., 1997)	

Morula foliacea **Conrad**

1932	Spec - BPBM-MO 198180	Reef off Fort Kamehameha. Catalogue XIV.
1936	Spec - BPBM-MO 234727	Reefs at Fort Kamehameha. Catalogue XVI.

Morula granulata **Duclos, 1832** **Hawaiian name(s): pupu maka`awa; maka`awa.**

Unknown	Spec - BPBM-MO 204188	Fort Kamehameha. Catalogue XIV. May be M. uva.

Legacy Project - Species Report (Cont.)

Unknown	Spec - BPBM-MO 62001	Catalogue V.
1927	Spec - BPBM-MO 234751	Naval Station. Catalogue XVI.
1927	Spec - BPBM-MO 74	Naval Station.
1932	Spec - BPBM-MO 198242	Fort Kamehameha. Catalogue XIV. May be M. uva.
1932	Spec - BPBM-MO 198243	Fort Kamehameha. Catalogue XIV. May be M. uva.
1932	Spec - BPBM-MO 198300	End of Waipio Peninsula. Catalogue XIV.
1932	Spec - BPBM-MO 198301	End of Waipio Peninsula. Catalogue XIV.

Morula mitosa? **Dall**

1927	Spec - BPBM-MO 73	Naval Station.

Morula spinosa **H. and A. Adams, 1853**

1932	Spec - BPBM-MO 198280	Fort Kamehameha. Catalogue XIV.

Morula uva **Röding, 1798**

1949	Spec - BPBM-MO 234787	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Morula vexilla **(Kuroda, 1953)**

1961	Spec - BPBM-MO 222217	Off Fort Kamehameha. Catalogue XV.

Genus: *Murex*

Murex sandwichensis **Pease**

1932	Spec - BPBM-MO 198399	Fort Kamehameha, reef off. Catalogue XIV.

Genus: *Vitularia*

Vitularia miliaris **Gmelin, 1791** **Cryptogenic.**

1916	Spec - BPBM-MO 234532	Reef Waikiki of entrance to Pearl Harbor. Catalogue XVI.
1936	Spec - BPBM-MO 234537	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.
1950	Ref - Burgess, 1963	Recorded as Vitularia milaris.

Family: NASSARIIDAE

Genus: *Nassarius*

Nassarius crematus **(Hinds, 1844)**

1961	Spec - BPBM-MO 220604	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 220605	Off Fort Kamehameha. Catalogue XV.
1961	Spec - BPBM-MO 220606	Off Fort Kamehameha. Catalogue XV.

Family: NEPTUNEIDAE

Genus: *Caducifer*

Caducifer decapitata **Reeve**

1936	Spec - BPBM-MO 235879	E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Genus: *Clathurella*

Clathurella fuscomaculata **Pease, 1860**

1932	Spec - BPBM-MO 200762	Fort Kamehameha, reef off. Catalogue XIV.

Family: PYRAMIDELLIDAE

Genus: *Evalea*

Evalea peasei **Dautzenberg & Bouge, 1933 Hawaiian name(s): pupu po`ai.**

1973	Ref - Evans et al., 1974	Recorded as Odostomia eclecta Pilsbry.

Genus: *Herviera*

Herviera patricia **Pilsbry, 1918**

1973	Ref - Evans et al., 1974	Recorded as Odostomia patricia Pilsbry.

Genus: *Hinemoa*

Hinemoa indica **(Melvill, 1896) Introduced.**

1973	Ref - Evans et al., 1974	Recorded as Odostomia indica Melvill.
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Genus: *Miralda*

Miralda paulbartschi **Pilsbry, 1918**

1973	Ref - Evans et al., 1974	Recorded as Odostomia paulbartschi Pilsbry.

Legacy Project - Species Report (Cont.)

Miralda scopulorum **Watson, 1886**
1973 Ref - Evans et al., 1974 Recorded as Odostomia scopulorum Watson.

Genus: *Odostomia*
Odostomia sp.
1943 Spec - BPBM-MO 11 From Railroad Wharf, Peninsula.
1973 Ref - Evans et al., 1974

Odostomia stearnsiella **Pilsbry, 1918**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Pyramidella*
Pyramidella sp.
1996 Legacy Project (Coles et al., 1997)

Pyramidella dolabrata **Linnaeus, 1758**
1961 Spec - BPBM-MO 220403 Off Fort Kamehameha. Catalogue XV.

Pyramidella miralis hawaiiensis **Dall**
1932 Spec - BPBM-MO 200124 Fort Kamehameha, reef. Catalogue XIV.

Pyramidella nitida **A. Adams**
Unknown Spec - BPBM-MO 64185 Ford Island. Catalogue V.

Pyramidella oahuanus **Pilsbry**
1932 Spec - BPBM-MO 200126 Fort Kamehameha, reef. Catalogue XIV.

Pyramidella sulcata **A. Adams, 1859 Hawaiian name(s): pupu `ole.**
1915 Spec - BPBM-MO 64201 Catalogue V.
1961 Spec - BPBM-MO 220435 Off Fort Kamehameha. Catalogue XV.

Genus: *Pyrgulina*
Pyrgulina oodes **(Watson, 1886) Cryptogenic.**
1973 Ref - Evans et al., 1974 Recorded as Odostomia oodes Watson.
1996 Legacy Project (Coles et al., 1997)

Genus: *Turbonilla*
Turbonilla sp.
1973 Ref - Evans et al., 1974

Family: TEREBRIDAE
Unidentified Terebridae
1961 Spec - BPBM-MO 222351 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 222352 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 222353 Off Fort Kamehameha. Catalogue XV.
1982 Spec - BPBM-MO 246144 Entrance to west. Catalogue XVII.

Genus: *Hastula*
Hastula matheroniana **Deshayes, 1859**
1961 Spec - BPBM-MO 219838 Off Fort Kamehameha. Catalogue XV.

Hastula nitida **Hinds, 1844**
1961 Spec - BPBM-MO 220973 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 221008 Off Fort Kamehameha. Catalogue XV.

Hastula penicillata **Hinds, 1844**
1961 Spec - BPBM-MO 220950 Off Fort Kamehameha. Catalogue XV.

Genus: *Terebra* **Hawaiian name(s): loloa; `oi `oi.**
Duplicaria gouldi **Deshayes**
1915 Spec - BPBM-MO 54 Off entrance, M. 5, l. 1.
1961 Spec - BPBM-MO 219771 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 219772 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 219773 Off Fort Kamehameha. Catalogue XV.

Legacy Project - Species Report (Cont.)

Terebra sp.
1932 Spec - BPBM-MO 199570 Fort Kamehameha, reef off. Catalogue XIV.

Terebra achates **Weaver, 1960**
1932 Spec - BPBM-MO 199574 Catalogue XIV.

Terebra amoena **Deshayes, 1859**
1961 Spec - BPBM-MO 222344 Off Fort Kamehameha. Catalogue XV.

Terebra cerithina **Lamarck, 1822**
1961 Spec - BPBM-MO 220041 Off Fort Kamehameha. Catalogue XV.

Terebra cerithina? **Lamarck, 1822**
1991 Spec - BPBM-MO 246085 Fort Kamehameha south end housing area. Catalogue XVII.

Terebra columellaris **Hinds, 1844**
1961 Spec - BPBM-MO 219725 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 221205 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 222330 Off Fort Kamehameha. Catalogue XV.

Terebra funiculata **Hinds, 1844**
1915 Spec - BPBM-MO 19 Dredged off entrance to Pearl Harbor, Map 35, loc. 1.
1961 Spec - BPBM-MO 219728 Off Fort Kamehameha. Catalogue XV.

Terebra lanta **Pease**
1915 Spec - BPBM-MO 9 Dredged off entrance to Pearl Harbor, Map 34, loc. 1.

Terebra maculata **Linnaeus, 1758 Hawaiian name(s): pupu `ole.**
1961 Spec - BPBM-MO 219863 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 219864 Off Fort Kamehameha. Catalogue XV.

Terebra pertusa **Born**
1917 Spec - BPBM-MO 29 Off Pearl Harbor.

Terebra plumbea **Quoy**
1915 Spec - BPBM-MO 7 Dredged off entrance to Pearl Harbor, Map 35, loc. 1.

Family: THAIDIDAE

Genus: *Muricodrupa*
Muricodrupa funiculus **Wood**
Unknown Spec - BPBM-MO 234516 Catalogue XVI.

Genus: *Nassa*
Nassa sp.
1934 Spec - BPBM-MO 205582 Dredge. Catalogue XIV.

Nassa serta
1932 Spec - BPBM-MO 198407 Fort Kamehameha, reef off. Catalogue XIV.

Genus: *Pinaxia*
Pinaxia versicolor **Gray, 1839**
1936 Spec - BPBM-MO 234832 E shore of entrance; reef at Fort Kamehameha. Catalogue XVI.

Genus: *Vexilla*
Vexilla sp.
1932 Spec - BPBM-MO 198326 Fort Kamehameha, reef off. Catalogue XIV.

Family: TURRIDAE

Unidentified Turridae
1973 Ref - Evans et al., 1974

Genus: *Anacithara*
Anacithara perfecta **Kay, 1979**
Unknown Spec - BPBM-MO 9817 Honouliuli, West Loch. Catalogue I.

Genus: *Carinapex*
Carinapex sp.
1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Genus: *Cymatosyrinx*
Cymatosyrinx mighelsi **Dall**
Unknown Spec - BPBM-MO 65654 Catalogue V.

Genus: *Etrema*
Etrema sp.?
1961 Spec - BPBM-MO 220816 Off Fort Kamehameha. Catalogue XV.

Genus: *Gemmula*
Gemmula interpolata **Powell, 1967**
1961 Spec - BPBM-MO 220825 Off Fort Kamehameha. Catalogue XV.

Gemmula monilifera **Pease, 1861**
1961 Spec - BPBM-MO 220764 Off Fort Kamehameha. Catalogue XV.

Genus: *Kermia*
Kermia sp.
1996 Legacy Project (Coles et al., 1997)

Genus: *Lora*
Lora sp. a-7
Unknown Spec - BPBM-MO 61097 Catalogue V.

Genus: *Philbertia*
Philbertia katharia **Dall**
Unknown Spec - BPBM-MO 65696 Catalogue V.

Philbertia lutea **Pease**
Unknown Spec - BPBM-MO 65697 Catalogue V.

Genus: *Turris*
Turris crispa intricata
1961 Spec - BPBM-MO 220826 Off Fort Kamehameha. Catalogue XV.

Order: CEPHALASPIDEA
Family: ACTEONIDAE
Genus: *Pupa*
Pupa tessellata
1961 Spec - BPBM-MO 220460 Off Fort Kamehameha. Catalogue XV.

Family: ATYIDAE
Genus: *Haminea*
Haminoea galba **Pease, 1861**
1936 Spec - BPBM-MO 13 Fossil near Yacht Club.

Family: BULLIDAE
Genus: *Bulla*
Bulla vernicosa **Gould, 1855** **Hawaiian name(s): pupu waha loa.**
1961 Spec - BPBM-MO 220487 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 220488 Off Fort Kamehameha. Catalogue XV.
1996 Legacy Project (Coles et al., 1997)

Family: HAMINOEIDAE
Genus: *Atys*
Atys debilis **Pease, 1860** **Indigenous.**
2008 This Project

Atys kuhnsi **Pilsbry, 1917**
1996 Legacy Project (Coles et al., 1997)

Atys kuhnsi? **Pilsbry, 1917**
1961 Spec - BPBM-MO 220543 Off Fort Kamehameha. Catalogue XV.

Atys semistriata **Pease, 1860**
1921 Ref - Pilsbry, 1921 Recorded as Atys semistriata fordinsulae.

Legacy Project - Species Report (Cont.)

Family: HYDATINIDAE
Genus: *Hydatina*
Hydatina amplustre **(Linnaeus, 1758) Hawaiian name(s): pupu leholeho oni`oni`o; pupu lei hala.**

1961	Spec - BPBM-MO 220478	Off Fort Kamehameha. Catalogue XV.

Order: BASOMMATOPHORA
Family: ELLOBIIDAE
Genus: *Melampus*
Melampus castaneus **Montfort Hawaiian name(s): `aoa.**

1923	Spec - BPBM-MO 1	Near Railroad Wharf.

Family: SIPHONARIIDAE
Genus: *Siphonaria*
Siphonaria normalis **Gould, 1846 Indigenous. Common name(s): False ‘opihi; Hawaiian name(s): `opihi awa;**
`opihi maikauli.

Unknown	Spec - BPBM-MO 60569	Catalogue V.
1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	
2007	This Project	
2008	This Project	

Genus: *Williamia*
Williamia cf. radiata sp. **(Pease, 1861)**

1996	Legacy Project (Coles et al., 1997)	

Order: SACOGLOSSA
Family: CALIPHYLLIDAE
Genus: *Cyerce*
Cyerce elegans

1996	Legacy Project (Coles et al., 1997)	

Family: JULIIDAE
Genus: *Julia*
Julia exquisita **Gould, 1862**

1973	Ref - Evans et al., 1974	Off Pearl Harbor.

Order: NOTASPIDEA
Family: UMBRACULIDAE
Genus: *Umbraculum*
Umbraculum sp.

1996	Legacy Project (Coles et al., 1997)	

Umbraculum sinicum **(Gmelin, 1791)**

1932	Spec - BPBM-MO 200038	Pearl Harbor channel. Catalogue XIV.
1932	Spec - BPBM-MO 200039	Fort Kamehameha, reef. Catalogue XIV.

Order: NUDIBRANCHIA
Unidentified Nudibranchia

1996	Legacy Project (Coles et al., 1997)	

Family: DENDRODORIDIDAE
Genus: *Dendrodoris*
Dendrodoris nigra **(Stimpson, 1856)**

1975	Ref - Grovhoug, 1976	

Legacy Project - Species Report (Cont.)

Family: TETHYIDAE
Genus: *Tethya*
Tethya sp.

1993	Ref - Brock, 1994
1994	Ref - Brock, 1995

Tethya dipoderma **Schmidt, 1870**

1993	Ref - Brock, 1994
1994	Ref - Brock, 1995

Order: CRYPTOBRANCHIA
Family: DORIDIDAE
Genus: *Hypselodoris*
Hypselodoris infucata **(Ruppell & Leuckart, 1828) Indigenous. Common name(s): Painted Nudibrach.**

1996	Legacy Project (Coles et al., 1997)
2007	This Project
2008	This Project

Family: HEXABRANCHIDAE
Genus: *Hexabranchus*
Hexabranchus sanguineus **(Ruppell & Leuckart, 1831)**

1949	Spec - BPBM-MO 209630	Found at Pearl Harbor (#15). Catalogue XIV.
1949	Spec - BPBM-MO 209631	(#16). Catalogue XIV.
1949	Spec - BPBM-MO 209632	From open shore (#17). Catalogue XIV.
1950	Spec - BPBM-MO 209633	(#18). Catalogue XIV.
1950	Spec - BPBM-MO 209634	(#19). Catalogue XIV.
1950	Spec - BPBM-MO 209636	Probably Pearl Harbor (#21). Catalogue XIV.

Order: ARCHAEOPULMONATA
Family: MELAMPODIDAE
Genus: *Allochroa*
Allochroa bronnii

Unknown	Spec - BPBM-MO 10998	Catalogue II.
Unknown	Spec - BPBM-MO 64832	Hoaiai. Catalogue V.

Genus: *Laemodonta*
Laemodonta octanfracta

Unknown	Spec - BPBM-MO 64874	Hoaiai. Catalogue V.
Unknown	Spec - BPBM-MO 64875	Hoaiai. Catalogue V.
1915	Spec - BPBM-MO 14	Ford Island.
1915	Spec - BPBM-MO 16	Ford Island.
1923	Spec - BPBM-MO 15	Under rocks near Railroad Wharf, opposite Ford Island.
1923	Spec - BPBM-MO 17	Near Railroad Wharf, opposite Ford Island.
1923	Spec - BPBM-MO 67478	Pearl City Peninsula. Catalogue V.
1932	Spec - BPBM-MO 199237	Fort Kamehameha, shore at. Catalogue XIV.
1932	Spec - BPBM-MO 199238	Peninsula; along shore at Cobb's place. Catalogue XIV.
1932	Spec - BPBM-MO 199241	Pearl City Peninsula, near Railroad Wharf, along shore at Cobb's place. Catalogue XIV.
1932	Spec - BPBM-MO 199242	Eastern side of Peninsula, Fish Pond wall. Catalogue XIV.

Genus: *Plectotrema*
Plectotrema sp.

1932	Spec - BPBM-MO 199243	Eastern side of Peninsula, Fish Pond wall. Catalogue XIV.

Class: POLYPLACOPHORA
Order: ISCHNOCHITONIDA
Family: ISCHNOCHITONIDAE
Genus: *Ischnochiton*
Ischnochiton petaloides **Gould Hawaiian name(s): pupu mo`o.**

Unknown	Spec - BPBM-MO 64604	Ford Island. Catalogue V.
1931	Spec - BPBM-MO 78	
1932	Spec - BPBM-MO 199796	Peninsula, Railroad Wharf. Catalogue XIV.

Legacy Project - Species Report (Cont.)

Family: MOPALIIDAE
Genus: *Plaxiphora*
Plaxiphora kamehamehae **Ferreira & Bertsch, 1979**

1977	Spec - BPBM-MO 207066	Fort Kamehameha Beach. Catalogue XIV.

Order: ACANTHOCHITONIDA
Family: ACANTHOCHITONIDAE
Genus: *Acanthochiton*
Acanthochiton viridis **Pease, 1872** **Hawaiian name(s): kuakulu; kuapa`a; pe`elua; pupu pe`elua.**

Unknown	Spec - BPBM-MO 64598	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 64600	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 64601	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 64783	Ford Island. Catalogue V.

Class: BIVALVIA
Unidentified Bivalvia

1996	Legacy Project (Coles et al., 1997)	

Family: EURYCYNIDAE
Unidentified Eurycynidae

1996	Legacy Project (Coles et al., 1997)	

Order: ARCOIDA
Family: ANOMIIDAE
Genus: *Anomia*
Anomia nobilis **Reeve, 1856** **Introduced. Hawaiian name(s): pa; papaua.**

Unknown	Spec - BPBM-MO 60317	Ford Island. Catalogue V.
1912	Spec - BPBM-MO 68170	(Pliocene). Catalogue V.
1915	Spec - BPBM-MO 20	Map 35, l.2.
1915	Ref - Bryan, 1915	
1919	Spec - BPBM-MO 60319	Drydock. Catalogue V.
1923	Spec - BPBM-MO 30	At Railroad Wharf opposite Ford Island, Peninsula.
1923	Spec - BPBM-MO 67480	Railroad Wharf, Pearl City Peninsula. Catalogue V.
1932	Spec - BPBM-MO 200174	Pearl City Peninsula, end. Catalogue XIV.
1932	Spec - BPBM-MO 200175	Pearl Harbor Channel; Watertown. Catalogue XIV.
1932	Spec - BPBM-MO 201515	Pearl City Peninsula, Railroad Wharf. Catalogue XIV.
1935	Ref - Edmondson, 1944	
1936	Ref - Edmondson & Ingram, 1939	
1938	Ref - Dall et al., 1938	USNM 337554.
1938	Ref - Dall et al., 1938	USNM 337552.
1938	Ref - Dall et al., 1938	USNM 321285.
1947	Spec - BPBM-MO 46	Bottom of barge in dry dock..
1948	Spec - BPBM-MO 40	Motile dry dock in Dry Dock #2..
1948	Spec - BPBM-MO 48	Bottom of steel barge..
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1978	Ref - Grovhoug, 1979	
1985	Ref - Hurlbut, 1990	
1986	Ref - Lenihan, 1990	
1987	Ref - Brewer & Assoc., 1987	
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	
2007	This Project	
2008	This Project	

Legacy Project - Species Report (Cont.)

Family: ARCIDAE

Genus: *Anadara*

Anadara antiquata **(Linneaus, 1758) Fossil.**

1923	Spec - BPBM-MO 21	Near Ford Island Wharf in short bluffs.
1938	Ref - Dall et al., 1938	Recorded as Arca vetula. USNM 36158.

Genus: *Arca* **Hawaiian name(s): kupukele.**

Arca sp.

1973	Ref - Evans et al., 1974	

Arca sp. a-3

Unknown	Spec - BPBM-MO 60151	Catalogue V.

Genus: *Barbatia*

Barbatia sp.

1982	Spec - BPBM-MO 207410	Off Pearl Harbor. Catalogue XIV.

Barbatia divaricata **Sowerby, 1833**

1959	Spec - BPBM-MO 218776	Off Fort Kamehameha. Catalogue XV.

Barbatia foliata **Forsskål, 1775 Fossil.**

1938	Ref - Dall et al., 1938	Recorded as Barbatia hendersoni. BPBM 351286.
1950	Spec - BPBM-MO 250728	Ship bottom (with Mytilidae). Catalogue XVII.

Barbatia nuttingi **(Dall, Bartsch & Rehder, 1938) Indigenous.**

1973	Ref - Evans et al., 1974	

Barbatia tenella **Reeve, 1844**

1938	Ref - Dall et al., 1938	Off Pearl Harbor. Recorded as Calloarca hua. USNM 427760.

Genus: *Bentharca*

Bentharca asperula **Dall, 1881**

1959	Spec - BPBM-MO 221099	Off Pearl Harbor. Catalogue XV.

Family: GLYCYMERIDIDAE

Genus: *Glycymeris*

Glycymeris molokaia **Dall, Bartsch & Rehder**

1961	Spec - BPBM-MO 218786	Off Fort Kamehameha. Catalogue XV.

Family: GRYPHAEIDAE

Genus: *Hyotissa*

Hyotissa hyotis **Linnaeus, 1758 Introduced.**

1950	Ref - Paulay, 1996	USNM 700474.
1950	Ref - Paulay, 1996	USNM 699996.

Genus: *Parahyotissa*

Parahyotissa numisma **(Lamarck, 1819) Indigenous.**

Unknown	Spec - BPBM-MO 60242	Catalogue V.
1902	Ref - Dall et al., 1938	Recorded as O. thaanami Dall et al., 1938. USNM 335600.
1932	Spec - BPBM-MO 200507	Fort Kamehameha, reef off. Catalogue XIV.
1935	Ref - Ingram, 1937	Recorded as O. thaanumi.
1973	Ref - Evans et al., 1974	Recorded as Ostrea hanleyana.

Family: ISOGNOMONIDAE

Genus: *Isognomon*

Isognomon sp. **Indigenous.**

1934	Spec - BPBM-MO 205583	Dredge. Catalogue XIV.
1973	Ref - Evans et al., 1974	
1979	Ref - AECOS, 1979	Off Pearl Harbor.
1986	Ref - Lenihan, 1990	
2008	This Project	

Isognomon sp. m-2

Unknown	Spec - BPBM-MO 60199	Catalogue V.

Isognomon anomioides **Reeve**

1932 Spec - BPBM-MO 200513 Fort Kamehameha. Catalogue XIV.

Isognomon californicum **(Conrad, 1837) Indigenous.**

2008 This Project

Isognomon incisum **Conrad**

Unknown Spec - BPBM-MO 203996 Fort Kamehameha. Catalogue XIV.
Unknown Spec - BPBM-MO 60162 Catalogue V.
1936 Spec - BPBM-MO 22 Reef at Fort Kamahameha.
1949 Spec - BPBM-MO 23 Reef at Fort Kamahameha.

Isognomon legumen **(Gmelin, 1791) Indigenous.**

1996 Legacy Project (Coles et al., 1997)
2008 This Project

Isognomon perna **(Linnaeus, 1767) Indigenous. Hawaiian name(s): nahawele.**

Unknown Spec - BPBM-MO 60176 Catalogue V.
1920 Ref - Dall et al., 1938 Recorded as Isognomon costellatum. USNM 337484.
1920 Ref - Dall et al., 1938 Recorded as Isognomon costellatum. USNM 428275.
1973 Ref - Evans et al., 1974
2008 This Project

Family: LIMIDAE

Genus: *Lima*

Lima aperta **Sowerby**

1932 Spec - BPBM-MO 200194 Fort Kamehameha; along edge of channel. Catalogue XIV. Questionable ID.

Family: MALLEIDAE

Genus: *Malleus*

Malleus daemonicus? **Reeve, 1858**

1950 Spec - BPBM-MO 250727 Ship bottom. Catalogue XVII.

Malleus regula **(Forsskål, 1775)**

1943 Ref - Hutchins, 1949 Recorded as Malleus nuttalli.

Family: MYTILIDAE

Unidentified Mytilidae

1950 Spec - BPBM-MO 250729 Ship bottom (with BPBM 250728). Catalogue XVII.

Genus: *Brachidontes*

Brachidontes crebristriatus **(Conrad, 1837) Indigenous. Hawaiian name(s): `owa`owaka; nahawelepahikaua; nahawele li`ili`i; kio nahawele.**

Unknown Spec - BPBM-MO 60320 Catalogue V.
1902 Ref - Dall et al., 1938 USNM 335839.
1920 Ref - Dall et al., 1938 USNM 428391.
1920 Ref - Dall et al., 1938 Recorded as Brachidontes crebristriatus maritimus. USNM 428270.
1921 Ref - Pilsbry, 1921 Recorded as Mytilus crebristiatus.
1923 Spec - BPBM-MO 196317 Peninsula; Railroad Wharf. Catalogue XIV.
1938 Ref - Dall et al., 1938 USNM 337445.
1938 Ref - Dall et al., 1938 BPBM 159.
1973 Ref - Evans et al., 1974 Recorded as Hormomya crebristriatus (Conrad).
1996 Legacy Project (Coles et al., 1997)

Genus: *Lithophaga*

Lithophaga fasciola **Dall, Bartsch & Rehder, 1938**

1996 Legacy Project (Coles et al., 1997)

Genus: *Musculus*

Musculus oahuensis **Dall, Bartsch & Rehder, 1938**

1920 Ref - Dall et al., 1938 USNM 484181.

Legacy Project - Species Report (Cont.)

Genus: *Septifer*

Septifer bryanae **Pilsbry, 1921**

1972	Ref - Long, 1974	Off Pearl Harbor.

Family: OSTREIDAE

Unidentified Ostreidae

1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Genus: *Crassostrea*

Crassostrea sp. **Introduced.**

1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Crassostrea gigas **(Thunberg, 1793) Introduced.**

1938	Ref - Brock, 1960	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
2007	Ref - Brock, 2007	

Crassostrea retusa **Sowerby, 1871 Fossil.**

1899	Spec - BPBM-MO 67990	1/4 mile E. of Waipio Station in Railway cut near Pearl Harbor 30ft. above Tide..
		Catalogue V.
1912	Spec - BPBM-MO 68168	(Pliocene). Catalogue V.
1923	Spec - BPBM-MO 67483	Shore. Eastside of Waipio Peninsula. Catalogue V.
1932	Spec - BPBM-MO 200301	Waipio Peninsula. Catalogue XIV.

Crassostrea virginica **(Gmelin, 1791) Introduced.**

Unknown	Spec - BPBM-MO 50	
1866	Ref - Kay, 1979	
1893	Ref - Kay, 1979	
1920	Ref - Edmondson & Wilson, 1940	
1962	Ref - Sparks, 1963	
1964	Ref - Sakuda, 1964	
1965	Ref - Rifkin & Cheng, 1968	
1972	Ref - Kawamoto & Sakuda, 1973	
1973	Ref - Evans et al., 1974	
1987	Ref - AECOS, 1987	
1987	Ref - Brewer & Assoc., 1987	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2008	This Project	

Genus: *Dendostrea*

Dendostrea sandvicensis **Sowerby, 1871 Indigenous. Common name(s): Noble Vermitid.**

Unknown	Spec - BPBM-MO 60225	Catalogue V.
Unknown	Spec - BPBM-MO 60226	Catalogue V.
Unknown	Spec - BPBM-MO 60228	Catalogue V.
Unknown	Spec - BPBM-MO 60231	Catalogue V.
1902	Ref - Dall et al., 1938	Recorded as Ostrea sandvichensis. USNM 335584.
1902	Ref - Dall et al., 1938	Recorded as O. kupua Dall et al., 1938. USNM 335586.
1912	Spec - BPBM-MO 68169	(Pliocene). Catalogue V.
1915	Spec - BPBM-MO 31	Ford Island.
1915	Ref - Bryan, 1915	Recorded as O. rosacea.
1920	Ref - Dall et al., 1938	Recorded as O. kupua Dall et al., 1938. USNM 321289.
1920	Ref - Dall et al., 1938	Recorded as O. kupua Dall et al., 1938. USNM 484156.
1920	Ref - Dall et al., 1938	Recorded as O. kupua Dall et al., 1938. USNM 321284.
1921	Ref - Pilsbry, 1921	Recorded as Ostrea sandvichensis.
1921	Ref - Pilsbry, 1921	Recorded as Ostrea sandvichensis. MCZ 31714.
1923	Spec - BPBM-MO 32	At Railroar Wharf opposite Ford Island, Peninsula.

Legacy Project - Species Report (Cont.)

1932	Spec - BPBM-MO 200209	Pearl City Peninsula, East side. Catalogue XIV.
1932	Spec - BPBM-MO 200508	Peninsula, Railroad Wharf. Catalogue XIV.
1935	Ref - Edmondson, 1944	Recorded as Ostrea sandvichensis.
1936	Ref - Edmondson & Ingram, 1939	Recorded as Ostrea sandvichensis.
1938	Ref - Dall et al., 1938	Recorded as Ostrea sandvichensis. USNM 337472.
1938	Ref - Dall et al., 1938	Recorded as O. kupua Dall et al., 1938. BPBM 60225.
1972	Ref - Long, 1974	Recorded as O. sandvichensis var. thaanumi.
1973	Ref - Evans et al., 1974	Recorded as Ostrea sandvichensis.
1987	Ref - Brewer & Assoc., 1987	Recorded as Ostrea sandvichensis.
1993	Ref - Brock, 1994	Recorded as Ostrea sandvichensis.
1994	Ref - Brock, 1995	Recorded as Ostrea sandvichensis.
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	Recorded as Ostrea sandvichensis.
2008	This Project	

Genus: *Lopha*

Lopha cristigalli **(Linnaeus, 1758) Introduced.**

1951	Ref - Paulay, 1996	USNM 699998.

Genus: *Nanostrea*

Nanostrea exigua **Harry, 1985**

1985	Ref - Harry, 1985	
1996	Ref - Paulay, 1996	USNM 337556.

Genus: *Ostrea*

Ostrea sp.

1923	Spec - BPBM-MO 241135	Pearl City Peninsula, Railroad Wharf. Catalogue XVII.
1932	Spec - BPBM-MO 198727	Naval Station, Hospital Point. Catalogue XIV.
1932	Spec - BPBM-MO 200186	Peninsula; Railroad Wharf. Catalogue XIV.
1932	Spec - BPBM-MO 201517	Pearl City Peninsula, Railroad Wharf. Catalogue XIV.
1950	Spec - BPBM-MO 57	Pahu, Ship bottom..
1950	Spec - BPBM-MO 58	
1972	Ref - Long, 1974	Recorded as Ostrea frons.
1973	Ref - Evans et al., 1974	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	

Ostrea cf. hanleyana **Sowerby, 1871 Indigenous.**

2008	This Project	

Ostrea lima **Sowerby, 1871 Indigenous.**

1972	Ref - Long, 1974	Recorded as O. kavaia Dall et al., 1938.

Ostrea margaritae **Pisbry, 1918**

Unknown	Spec - BPBM-MO 65691	Catalogue V.

Genus: *Saccostrea*

Saccostrea cucullata **(Born, 1778)**

1996	Legacy Project (Coles et al., 1997)	

Family: PECTINIDAE

Genus: *Anguipecten*

Anguipecten lamberti **Sowerby, 1874**

1961	Spec - BPBM-MO 218856	Off Fort Kamehameha. Catalogue XV. Questionable ID.

Genus: *Chlamys*

Chlamys sp.

1934	Spec - BPBM-MO 205571	Dredge. Catalogue XIV.
1934	Spec - BPBM-MO 205572	Dredge. Catalogue XIV.

Chlamys irregularis **(Sowerby, 1842) Indigenous.**

Unknown	Spec - BPBM-MO 60247	Catalogue V.
1923	Spec - BPBM-MO 39	Ford Island Wharf on Penisula.

1927 Spec - BPBM-MO 196278 Pearl Harbor channel, at Watertown. Catalogue XIV.
1961 Spec - BPBM-MO 218823 Off Fort Kamehameha. Catalogue XV.
1961 Spec - BPBM-MO 218824 Off Fort Kamehameha. Catalogue XV.

Genus: *Pecten*

Pecten n. sp. p-4

Unknown Spec - BPBM-MO 60291 Ford Island. Catalogue V. Questionable ID.

Pecten n. sp. p-5

Unknown Spec - BPBM-MO 60292 Catalogue V. Questionable ID.

Family: PINNIDAE

Genus: *Pinna*

Pinna sp.

1973 Ref - Evans et al., 1974

Pinna muricata **Linnaeus, 1758**

1972 Ref - Long, 1974 Off Pearl Harbor.

Family: PTERIIDAE

Genus: *Pinctada*

Pinctada sp. **Indigenous.**

Unknown Spec - BPBM-MO 45
2007 This Project

Pinctada cumingi **Reeve**

1923 Spec - BPBM-MO 196332 End of Wipio Peninsula. Catalogue XIV. Questionable ID.
1927 Spec - BPBM-MO 196322 Reef off Fort Kamehameha, shallow water, in hole in reef. Catalogue XIV.
Questionable ID.

Pinctada margaritifera **(Linnaeus, 1758) Indigenous. Common name(s): mother-of-pearl shell; Hawaiian name(s): pa; pa hau.**

1915 Ref - Bryan, 1915 Recorded as Avicula margaritifera.
1926 Spec - BPBM-MO 208454 Shore, rocks east of Mokapu. Catalogue XIV.
1936 Spec - BPBM-MO 24 Reef at Fort Kamahameha.
1972 Ref - Long, 1974 Off Pearl Harbor.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Pinctada radiata **(Leach, 1814) Indigenous. Hawaiian name(s): unahi pipi; pipi.**

Unknown Spec - BPBM-MO 203988 Catalogue XIV.
Unknown Spec - BPBM-MO 203989 Catalogue XIV.
Unknown Spec - BPBM-MO 60216 Catalogue V.
Unknown Spec - BPBM-MO 67565 Catalogue V.
1915 Spec - BPBM-MO 25
1915 Ref - Bryan, 1915 Recorded as Margaritifera fimbriata.
1917 Spec - BPBM-MO 60222 Catalogue V.
1923 Spec - BPBM-MO 196320 Waipio Peninsula, extreme seaward end. Catalogue XIV.
1923 Spec - BPBM-MO 26 At Railroad Wharf, Ford Island, Peninsula..
1924 Spec - BPBM-MO 67482 Railroad Wharf, Pearl City Peninsula. Catalogue V.
1936 Ref - Edmondson & Ingram, 1939 Recorded as P. nebulosa.
1938 Ref - Dall et al., 1938 Recorded as P. nebulosa (Conrad, 1837). BPBM 9.
1938 Ref - Dall et al., 1938 Recorded as P. nebulosa (Conrad, 1837). USNM 337475.
1939 Ref - Dall et al., 1938 Recorded as P. nebulosa (Conrad, 1837). USNM 382878.
1996 Legacy Project (Coles et al., 1997)

Genus: *Pteria*

Pteria loveni **(Dunker, 1872)**

1972 Ref - Long, 1974 Off Pearl Harbor. Questionable ID.

Legacy Project - Species Report (Cont.)

Family: SPONDYLIDAE

Genus: *Spondylus*

Spondylus sp.

1950	Spec - BPBM-MO 250726	Ship bottom. Catalogue XVII.
1950	Spec - BPBM-MO 53	Bottom of YOC-41 in Dry Dock #2..
1973	Ref - Evans et al., 1974	

Spondylus sp.?

1950	Spec - BPBM-MO 49	

Spondylus linguaefelis **Sowerby, 1847**

1972	Ref - Long, 1974	Off Pearl Harbor. Recorded as Spondylus gloriosis.

Spondylus linguaefelis? **Sowerby, 1847**

1961	Spec - BPBM-MO 221073	Off Fort Kamehameha. Catalogue XV.

Spondylus sparsispinosus

1918	Spec - BPBM-MO 28	

Spondylus tenebrosus **Reeve, 1856**

2007	Ref - Brock, 2007	

Spondylus violacescens **Reeve, 1856 Hawaiian name(s): `okupe; pupu momi.**

Unknown	Spec - BPBM-MO 60310	Catalogue V.
1932	Spec - BPBM-MO 200223	Fort Kamehameha; along edge of channel. Catalogue XIV.
1973	Ref - Evans et al., 1974	Recorded as Spondylus hawaiensis Dall et al., 1938.
1993	Ref - Brock, 1994	Recorded as Spondylus tenebrosus.
1994	Ref - Brock, 1995	Recorded as Spondylus tenebrosus.

Order: VENEROIDA

Family: CARDIIDAE

Genus: *Trachycardium*

Trachycardium orbita **Sowerby, 1833 Hawaiian name(s): `olepe kupa; pupu kupa.**

1920	Ref - Dall et al., 1938	Recorded as T. hawaiiensis. USNM 346229.
1932	Spec - BPBM-MO 200248	Pearl Harbor Channel; Watertown. Catalogue XIV.

Family: CHAMIDAE

Genus: *Chama*

Chama sp. **Indigenous.**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Chama brassica **Reeve, 1847 Introduced.**

1951	Ref - Paulay, 1996	USNM 700006.

Chama cf. fibula **Reeve, 1846 Cryptogenic.**

2008	This Project	

Chama elatensis **Delsaerdt, 1986 Introduced.**

1996	Legacy Project (Coles et al., 1997)	

Chama fibula **Reeve, 1846 Cryptogenic.**

1920	Ref - Dall et al., 1938	Recorded as C. hendersoni. USNM 341296.
1920	Ref - Dall et al., 1938	Recorded as C. hendersoni. USNM 484174.
1935	Spec - BPBM-MO 35	Near Yacht Club.
1979	Ref - Kay, 1979	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Chama iostoma **Conrad, 1837 Indigenous.**

Unknown	Spec - BPBM-MO 60395	Catalogue V.
1920	Ref - Dall et al., 1938	USNM 484173.
1923	Spec - BPBM-MO 36	Near entrance.
2007	This Project	

2008 This Project

Chama lazarus **Linnaeus, 1758 Introduced.**
1950 Ref - Paulay, 1996 USNM 699558.
1996 Legacy Project (Coles et al., 1997)

Chama macerophylla **Gmelin, 1791**
2006 Ref - Smith et al., 2006 Recorded as Chama elatensis.

Chama pacifica **Brodrip, 1835 Introduced.**
1950 Ref - Paulay, 1996 USNM 699558.
1950 Ref - Paulay, 1996 USNM 699565.
1950 Ref - Paulay, 1996 USNM 699561.
1951 Ref - Paulay, 1996 USNM 699563.
1996 Legacy Project (Coles et al., 1997)

Family: GLOSSIDAE
Genus: *Meiocardia*
Meiocardia hawaiana **Dall, Bartsch & Rehder**
1961 Spec - BPBM-MO 218932 Off Fort Kamehameha. Catalogue XV.

Family: KELLIIDAE
Genus: *Lasaea*
Lasaea hawaiensis **Dall, Bartsch & Rehder, 1938**
1923 Spec - BPBM-MO 240097 Crevices in shore rocks, Peninsula. Catalogue XVI.
1923 Ref - Dall et al., 1938 Recorded as Lasaea hawaiiensis. BPBM 3.

Family: LUCINIDAE
Genus: *Ctena* **Hawaiian name(s): `olepe kupe.**
Ctena sp.
1934 Spec - BPBM-MO 205589 Dredge. Catalogue XIV.

Ctena bella **(Conrad, 1837) Indigenous. Hawaiian name(s): `olepe kupe `opiopio.**
1920 Ref - Dall et al., 1938 USNM 341291.
1920 Ref - Dall et al., 1938 USNM 428228.
1920 Ref - Dall et al., 1938 USNM 428390.
1923 Spec - BPBM-MO 196300 Peninsula; Railroad Wharf. Catalogue XIV.
1923 Spec - BPBM-MO 33 At Railroar Wharf opposite Ford Island, Peninsula.
1938 Spec - BPBM-MO 34 Near Yacht Club.
1961 Spec - BPBM-MO 218950 Off Fort Kamehameha. Catalogue XV.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Genus: *Lucina*
Lucina edentula **(Linnaeus, 1758)**
1961 Spec - BPBM-MO 218798 Off Fort Kamehameha. Catalogue XV.

Genus: *Pillucina*
Pillucina spaldingi **(Pilsbry, 1921)**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Family: MACTRIDAE
Genus: *Mactra*
Mactra thaanumi **Dall, Bartsch & Rehder**
1963 Spec - BPBM-MO 221087 Off Pearl Harbor. Catalogue XV.

Family: SEMELIDAE
Genus: *Abra*
Abra sp. A sp. **Introduced.**
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Semele*

Semele australis **Sowerby, 1832**

Unknown	Spec - BPBM-MO 209617	Catalogue XIV.

Family: TELLINIDAE

Unidentified Tellinidae

1996	Legacy Project (Coles et al., 1997)	

Genus: *Macoma*

Macoma dispar **(Conrad, 1837)**

Unknown	Spec - BPBM-MO 60512	Ford Island. Catalogue V.
1915	Spec - BPBM-MO 27	Ford Island.
1920	Ref - Dall et al., 1938	Recorded as Scissulina dispar. USNM 341298.
1935	Spec - BPBM-MO 3	In a road cut near Yacht Club.
1938	Ref - Dall et al., 1938	Recorded as Scissulina dispar. USNM 337353.
1938	Ref - Dall et al., 1938	Recorded as Scissulina dispar. USNM 33754.

Macoma obliquilineata **(Conrad, 1837)**

1920	Ref - Dall et al., 1938	Recorded as Jactellina obliquilineata. USNM 331294.

Genus: *Pharoanella*

Pharoanella variabilis

Unknown	Spec - BPBM-MO 64344	Catalogue V. Questionable ID.

Genus: *Tellina*

Tellina sp.

1934	Spec - BPBM-MO 205593	Dredge. Catalogue XIV.
1961	Spec - BPBM-MO 219133	Off Fort Kamehameha. Catalogue XV.
1996	Legacy Project (Coles et al., 1997)	

Tellina sp. A

1996	Legacy Project (Coles et al., 1997)	

Tellina sp.?

1934	Spec - BPBM-MO 205579	Dredge. Catalogue XIV.

Tellina (Arcopagia) robusta **(Hanley, 1844)**

1920	Ref - Dall et al., 1938	Recorded as Pinquitellina robusta. USNM 341229.
1938	Ref - Dall et al., 1938	Recorded as Pinquitellina robusta. USNM 337359.
1973	Ref - Evans et al., 1974	Recorded as Angulus nucella Dall et al., 1938.

Tellina palatam **Iredale, 1929**

Unknown	Spec - BPBM-MO 209618	Catalogue XIV.
Unknown	Spec - BPBM-MO 60526	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 60527	Catalogue V.
1902	Ref - Dall et al., 1938	Recorded as Quidnipagus palatum. USNM 335579.
1915	Spec - BPBM-MO 60524	Catalogue V.
1920	Ref - Dall et al., 1938	Recorded as Quidnipagus palatum. USNM 341287.
1924	Spec - BPBM-MO 8	
1927	Spec - BPBM-MO 196248	E. side Pearl City Peninsula. Catalogue XIV.
1930	Spec - BPBM-MO 196571	Pearl Lochs. Catalogue XIV.
1938	Ref - Dall et al., 1938	Recorded as Quidnipagus palatum. BPBM.

Family: TRAPEZIIDAE

Genus: *Trapezium*

Trapezium sp.

1934	Spec - BPBM-MO 205590	Dredge. Catalogue XIV.

Family: VENERIDAE

Genus: *Lioconcha*

Lioconcha fasigata **Sowerby, 1851 New record for Hawaii. Cryptogenic. Common name(s): Hawaiian Oyster.**

2008	This Project	

Lioconcha hieroglyphica **(Conrad, 1837)**

Unknown	Spec - BPBM-MO 196259	E. side Pearl City Peninsula. Catalogue XIV.
Unknown	Spec - BPBM-MO 204102	Catalogue XIV.
Unknown	Spec - BPBM-MO 209620	Catalogue XIV.
1920	Ref - Dall et al., 1938	USNM 42195.
1927	Spec - BPBM-MO 196258	E. side Pearl City Peninsula. Catalogue XIV.
1930	Spec - BPBM-MO 196449	Pearl Lochs. Catalogue XIV.
1938	Ref - Dall et al., 1938	BPBM 165.
1961	Spec - BPBM-MO 218979	Off Fort Kamehameha. Catalogue XV.
1996	Legacy Project (Coles et al., 1997)	

Genus: ***Periglypta***

Periglypta sp.

1934	Spec - BPBM-MO 205573	Dredge. Catalogue XIV.
1934	Spec - BPBM-MO 205574	Dredge. Catalogue XIV.

Periglypta reticulata **(Linnaeus, 1758)**

Unknown	Spec - BPBM-MO 196218	Fort Kamehameha, 100 ft. inland from outer edge of reef.. Catalogue XIV.
Unknown	Spec - BPBM-MO 209622	Catalogue XIV.
1916	Spec - BPBM-MO 38	Reef Waikiki of Pearl Harbor channel entrance.
1920	Ref - Dall et al., 1938	Recorded as P. edmonsoni. USNM 428286.
1938	Ref - Dall et al., 1938	Recorded as P. edmonsoni. BPBM 2016c.

Genus: ***Venerupis***

Venerupis (Ruditapes) phillipinarum **(A. Adams & Reeve) Introduced.**

Unknown	Spec - BPBM-MO 209621	Catalogue XIV.
1918	Ref - Dall et al., 1938	Recorded as Venerupis philippinarum. USNM 337389.
1919	Ref - Bryan, 1919	Recorded as Tapes philippinarum okupi.
1920	Ref - Edmondson & Wilson, 1940	Recorded as Tapes philippinarum.
1920	Ref - Thaanaum, 1921	Recorded as Tapes philippinarum.
1924	Spec - BPBM-MO 10	Bought in fish market in Honolulu.
1924	Spec - BPBM-MO 67484	Catalogue V.
1937	Ref - Edmondson & Wilson, 1940	Recorded as Tapes philippinarum.
1996	Legacy Project (Coles et al., 1997)	

Genus: ***Venus***

Venus sp.

1934	Spec - BPBM-MO 205578	Dredge. Catalogue XIV.

Order: MYOIDA

Family: GASTROCHAENIDAE

Genus: ***Gastrochaena***

Gastrochaena gigantea **Spengler, 1783 Hawaiian name(s): `olepe waha nui;.**

Unknown	Spec - BPBM-MO 204046	Ford Island. Catalogue XIV.
Unknown	Spec - BPBM-MO 60547	Catalogue V.
Unknown	Spec - BPBM-MO 60548	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 60549	Ford Island. Catalogue V.
Unknown	Spec - BPBM-MO 60550	Ford Island. Catalogue V.
1915	Spec - BPBM-MO 4	Ford Island.
1920	Ref - Dall et al., 1938	Recorded as Rocellaria hawaiiensis. USNM 341293.
1938	Ref - Dall et al., 1938	Recorded as Rocellaria hawaiiensis. BPBM 60549.
1938	Ref - Dall et al., 1938	Recorded as Rocellaria hawaiiensis. BPBM 94.
1938	Ref - Dall et al., 1938	Recorded as Rocellaria hawaiiensis. USNM 337310.
1938	Ref - Dall et al., 1938	Recorded as Rocellaria hawaiiensis. USNM 361952.

Genus: ***Rocellaria***

Rocellaria sp.

1973	Ref - Evans et al., 1974	

Rocellaria gigantea **Deshayes Hawaiian name(s): `olepe waha nui; pupu olepe waha nui.**

1923	Spec - BPBM-MO 196238	End of Waipio Peninsula. Catalogue XIV.

1925	Spec - BPBM-MO 196241	Peninsula; Railroad Wharf. Catalogue XIV.
1927	Spec - BPBM-MO 196237	Pearl Harbor channel, off Fort Kamehameha. Catalogue XIV.

Family: HIATELLIDAE

Genus: *Hiatella*

Hiatella arctica **(Linnaeus, 1767) Introduced.**

1973	Ref - Evans et al., 1974	Recorded as Hiatella hawaiensis Dall et al., 1938.
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1975	Ref - Grovhoug, 1976	Recorded as Hiatella hawaiensis Dall et al., 1938.
1978	Ref - Grovhoug, 1979	Hiatella hawaiensis Dall, Bartsch & Rehder, 1938.
1987	Ref - Brewer & Assoc., 1987	Recorded as Hiatella hawaiensis Dall et al., 1938.
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Sphenia luticola **(H. & A. Adams, 1854) Introduced.**

1972	Ref - Long, 1974	Recorded as S. cf. fragilis (H. & A. Adams, 1846).

Family: MYIDAE

Genus: *Sphenia*

Sphenia sp. A sp. **Introduced.**

1996	Legacy Project (Coles et al., 1997)	

Family: PHOLADIDAE

Genus: *Martesia*

Martesia sp.

1939	Spec - BPBM-MO 205356	Catalogue XIV.

Martesia striata **(Linnaeus, 1758) Introduced. Hawaiian name(s): `olepe makaloa.**

Unknown	Spec - BPBM-MO 60554	Catalogue V.
1920	Ref - Dall et al., 1938	Recorded as M. hawaiiensis. USNM 484213.
1920	Ref - Dall et al., 1938	Recorded as M. hawaiiensis. USNM 218042.
1920	Ref - Dall et al., 1938	Recorded as M. hawaiiensis. BPBM 30.
1920	Ref - Dall et al., 1938	Recorded as M. hawaiiensis. USNM 484214.
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	

Genus: *Pholas*

Pholas sp.

Unknown	Spec - BPBM-MO 67987	Said by Dr. C.M. Cooke to have come from Pearl Harbor. Catalogue V.
		Questionable ID.

Family: TEREDINIDAE

Unidentified Teredinidae

1996	Legacy Project (Coles et al., 1997)	

Genus: *Bankia*

Bankia bipalmulata **(Lamarck, 1801) Introduced.**

1936	Ref - Edmondson, 1942	Recorded as Bankia hawaiiensis.
1976	Ref - Cooke et al., 1980	

Genus: *Lyrodus*

Lyrodus affinis **Deschayes, 1863 Introduced.**

1973	Ref - McCain, 1974	Recorded as Teredo ?milleri.
1973	Ref - McCain, 1975	Recorded as Teredo ?milleri.
1976	Ref - Cooke et al., 1980	

Lyrodus pedicillatus **(Quatrefages, 1849) Introduced.**

1935	Ref - Edmondson, 1940	Recorded as Bankia hawaiiensis.
1938	Ref - Dall et al., 1938	Recorded as Teredo kauaiensis.
1976	Ref - Cooke et al., 1980	

Legacy Project - Species Report (Cont.)

Genus: *Teredo* **Hawaiian name(s): wawahi wa`a.**

Teredo sp. **Indigenous.**

Unknown Spec - BPBM-MO 67988 Said by Dr. C.M. Cooke to have come from Pearl Harbor. Catalogue V.

1973 Ref - Evans et al., 1974
1986 Ref - Lenihan, 1990
2008 This Project

Teredo bartschi **Clapp, 1923 Introduced.**

1935 Ref - Edmondson, 1940
1935 Ref - Edmondson, 1942
1976 Ref - Cooke et al., 1980
1996 Legacy Project (Coles et al., 1997)

Teredo clappi **Bartsch, 1923 Introduced.**

1923 Ref - Dall et al., 1938 Recorded as T. trulliformis Miller, 1924. USNM 361888.
1924 Ref - Miller, 1924 Recorded as T. trulliformis Miller, 1924.
1976 Ref - Cooke et al., 1980

Teredo diegensis **Bartsch, 1916**

1924 Ref - Edmondson, 1940
1924 Ref - Edmondson, 1942
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Teredo furcifera **van Martens, 1894 Introduced.**

1921 Ref - Bartsch, 1921 Recorded as T. parksi Bartsch, 1921.
1921 Ref - Dall et al., 1938 Recorded as T. parksi Bartsch, 1921. USNM 345311.
1921 Ref - Dall et al., 1938 Recorded as T. parksi Bartsch, 1921. USNM 489211.
1921 Ref - Dall et al., 1938 Recorded as T. parksi Bartsch, 1921. USNM 341132.
1935 Ref - Edmondson, 1942 Recorded as T. parksi Bartsch, 1921.
1976 Ref - Cooke et al., 1980

Teredo oahuensis **Edmondson, 1942**

1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Class: SCAPHOPODA
Order: DENTALIDA
Family: DENTALIIDAE
Genus: *Dentalium*
Dentalium sp.

1961 Spec - BPBM-MO 220733 Off Fort Kamehameha. Catalogue XV.

Class: CEPHALOPODA
Order: OCTOPODA
Family: OCTOPODIDAE
Genus: *Polypus* **Hawaiian name(s): he`e mahola.**
Polypus sp.

1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Phylum: ARTHROPODA
Unidentified Arthropoda

Unknown Spec - BPBM-S 5962 Identified by J.L. Barnard.
Unknown Spec - BPBM-S 5963 Identified by J.L. Barnard.
1948 Spec - BPBM-S 5323
1950 Spec - BPBM-S 5628

Class: PYCNOGONIDA
Unidentified Pycnogonida

1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1996 Legacy Project (Coles et al., 1997)

2008 This Project

Order: PANTOPODA
Family: AMMOTHEIDAE
Genus: *Achelia*
Achelia plicata **Dillwyn**
1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Family: ENDEIDAE
Genus: *Endeis*
Endeis nodosa **Hilton, 1942**
1973 Ref - Evans et al., 1974

Endeis procera **(Loman)**
1996 Legacy Project (Coles et al., 1997)

Family: PYCNOGONIDAE
Genus: *Anoplodactylus*
Anoplodactylus sp.
1948 Spec - BPBM-S 8605 Identified by C.A. Child, 1969.

Anoplodactylus californicus **Hall**
1996 Legacy Project (Coles et al., 1997)

Anoplodactylus portus **Calman**
1937 Spec - BPBM-S 4963 Identified by J.H. Stock, 1967 (Loan #1616).
1945 Spec - BPBM-S 7219
1947 Spec - BPBM-S 7227
1948 Spec - BPBM-S 7243
1948 Spec - BPBM-S 8786 Drydock.
1973 Ref - Evans et al., 1974

Anoplodactylus projectus **Hilton**
1938 Spec - BPBM-S 4702 Identified by Dr. Hilton.

Anoplodactylus pyncnosoma **(Helfer)**
1996 Legacy Project (Coles et al., 1997)

Genus: *Pigrogromitus*
Pigrogromitus robustus **Calman**
1948 Spec - BPBM-S 8606 Identified by C.A. Child, 1969.

Pigrogromitus timsanus **Calman** **Introduced.**
1996 Legacy Project (Coles et al., 1997)

Class: CRUSTACEA
Unidentified Cirripedia
1931 Spec - BPBM-B 277
1976 Spec - BPBM-B 587 Merry Point.
1982 Spec - BPBM-B 499 Off Pearl Harbor; from dredge spoil dumping site.
1982 Spec - BPBM-B 513 Off Pearl Harbor; from dredge spoil dumping site.

Unidentified Copepoda
1996 Legacy Project (Coles et al., 1997)

Unidentified Ostracoda
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Family: CYLINDROLEBERIDIDAE
Genus: *Parasterope*
Parasterope sp. **Indigenous.**
2008 This Project

Legacy Project - Species Report (Cont.)

Family: CYPRIDIDAE
Genus: *Paravargula*
Paravargula sp. **Indigenous.**
2007 This Project
2008 This Project

Order: CYCLOPOIDA
Family: SAPPHIRINIDAE
Genus: *Copilia*
Copilia sp.
1973 Ref - Evans et al., 1974

Order: THORACICA
Family: BALANIDAE
Unidentified Balanidae
1934 Spec - BPBM-MO 205563 Dredge. Catalogue XIV.
1934 Spec - BPBM-MO 205564 Dredge. Catalogue XIV.

Genus: *Balanus*
Balanus sp. **Introduced. Common name(s): Acorn Barnacle.**
1973 Ref - Evans et al., 1974
1975 Spec - BPBM-B 565
1976 Ref - Cooke et al., 1980
1986 Ref - Lenihan, 1990
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Balanus amphitrite **Darwin Introduced. Common name(s): Acorn Barnacle.**
2008 This Project

Balanus amphitrite amphitrite **Darwin, 1854 Introduced.**
Unknown Spec - BPBM-B 332
1913 Ref - Pilsbry, 1928
1915 Spec - BPBM-B 233 Identified by Pilsbry.
1929 Spec - BPBM-B 270 Weinrich's place.
1929 Spec - BPBM-B 272 Middle Loch.
1931 Spec - BPBM-B 276
1933 Ref - Edmondson, 1933 Recorded as Balanus amphitrite.
1935 Ref - Edmondson & Ingram, 1939 Recorded as Balanus amphitrite.
1935 Ref - Edmondson, 1944 Recorded as B. amphitrite hawaiiensis Broch.
1935 Ref - Ingram, 1937 Recorded as Balanus amphitrite.
1943 Ref - Hutchins, 1949 Recorded as Balanus amphitrite.
1944 Spec - BPBM-B 312 Off Pearl Harbor.
1944 Spec - BPBM-B 313 Off Pearl Harbor.
1944 Spec - BPBM-B 314 Off Pearl Harbor.
1944 Spec - BPBM-B 315 Off Pearl Harbor.
1944 Spec - BPBM-B 316 Off Pearl Harbor.
1944 Spec - BPBM-B 331 Off Pearl Harbor.
1946 Ref - Edmondson, 1946 Recorded as B. amphitrite hawaiiensis.
1948 Ref - Henry & Mclaughlin, 1975:33
1972 Ref - Long, 1974
1973 Ref - Evans et al., 1974 Recorded as B. amphitrite hawaiiensis Broch.
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1975 Ref - Grovhoug, 1976 Recorded as B. amphitrite hawaiiensis Broch.
1987 Ref - Brewer & Assoc., 1987 Recorded as B. amphitrite hawaiiensis Broch.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Balanus amphitrite? **Darwin Introduced. Common name(s): Acorn Barnacle.**

1975	Spec - BPBM-B 568	Identified by T.L. Smalley.
1977	Spec - BPBM-B 615	Pearl Harbor?. Identified by T.L. Smalley.

Balanus crenatus **Bruguiere, 1789**

1972	Ref - Long, 1974	Off Pearl Harbor.

Balanus eburneus **Gould, 1841 Introduced. Common name(s): Reticulated Barnacle.**

1929	Spec - BPBM-B 271	
1943	Ref - Hutchins, 1949	
1946	Ref - Edmondson, 1946	
1948	Spec - BPBM-B 349	
1950	Spec - BPBM-B 368	
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1975	Spec - BPBM-B 567	Identified by T.L. Smalley.
1975	Ref - Grovhoug, 1976	
1975	Ref - Henry & Mclaughlin, 1975	Station number obtained from specimen cited in this publication.
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Balanus reticulatus **Utinomi, 1960 Introduced. Common name(s): Reticulated Barnacle.**

Unknown	Spec - BPBM-B 350	
1915	Ref - Henry & Mclaughlin, 1975:90	
1948	Ref - Henry & Mclaughlin, 1975	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1975	Ref - Grovhoug, 1976	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Balanus tintinnabulum **(Linnaeus, 1758)**

1943	Ref - Hutchins, 1949	Off Pearl Harbor.
1972	Ref - Long, 1974	Off Pearl Harbor.

Balanus trigonus **Darwin, 1854**

1943	Ref - Hutchins, 1949	
1948	Spec - BPBM-B 345	
1948	Spec - BPBM-B 350	
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	

Genus: *Chelonibia*

Chelonibia sp.

1973	Ref - Evans et al., 1974	

Family: CHTHAMALIDAE

Genus: *Chthamalus*

Chthamalus sp. **Introduced.**

1993	Ref - Brock, 1994	Recorded as Chthamalus hembeli.
1994	Ref - Brock, 1995	Recorded as Chthamalus hembeli.

Chthamalus proteus **Darbo & Southward, 1980 Introduced. Common name(s): Proteus Rock Barnacle.**

1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	Ref - Brock, 2007	
2008	This Project	

Legacy Project - Species Report (Cont.)

Family: LEPADIDAE
Genus: *Lepas*
Lepas anatifera **Linnaeus, 1758**
1943 Ref - Hutchins, 1949
1944 Spec - BPBM-B 330 Off Pearl Harbor.

Lepas anserifera anserifera **Linnaeus, 1759**
1943 Ref - Hutchins, 1949 Recorded as L. anserifera.

Order: MYSIDACEA
Unidentified Mysidacea
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Order: CUMACEA
Unidentified Cumacea
1996 Legacy Project (Coles et al., 1997)

Order: TANAIDACEA
Family: APSEUDIDAE
Genus: *Apseudes*
Apseudes sp.
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Apseudes sp. 1
1973 Ref - Evans et al., 1974 Recorded as Apseudes sp. 1.
1978 Ref - Grovhoug, 1979 Recorded as Apseudes sp. 1.

Apseudes sp. 2
1973 Ref - Evans et al., 1974 Recorded as Apseudes sp. 2.
1978 Ref - Grovhoug, 1979 Recorded as Apseudes sp. 2.

Apseudes sp. A
1996 Legacy Project (Coles et al., 1997)

Apseudes sp. 1 **Indigenous.**
2007 This Project

Apseudes tropicalis
1996 Legacy Project (Coles et al., 1997)

Genus: *Parapseudes*
Parapseudes neglectus **Indigenous.**
1996 Legacy Project (Coles et al., 1997)

Parapseudes pedispinis **Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Family: PSEUDOZEUXIDAE
Genus: *Leptochelia*
Leptochelia dubia **(Kroyer, 1852) Cryptogenic.**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Family: TANAIDAE
Genus: *Anatanais*
Anatanais insularis **Miller, 1940 Indigenous.**
1973 Ref - Evans et al., 1974

1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Order: ISOPODA
Family: ANTHURIDAE
Genus: *Mesanthura*
Mesanthura sp. A **Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Mesanthura hieroglyphica **Miller & Menzies, 1952**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Family: CIROLANIDAE
Unidentified Cirolanidae
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Genus: *Cirolana*
Cirolana sp.
1973 Ref - Evans et al., 1974

Cirolana parva? **Hansen**
1978 Ref - Grovhoug, 1979

Genus: *Hansenolana*
Hansenolana sphaeroformis **(Hansen)**
1973 Ref - Evans et al., 1974

Family: IDOTEIDAE
Genus: *Colidotea*
Colidotea edmondsoni **Miller, 1940**
1973 Ref - Evans et al., 1974

Family: JAEROPSIDIDAE
Genus: *Jaeropsis*
Jaeropsis hawaiiensis **Miller, 1941**
1927 Ref - Miller, 1941

Family: JANIRIDAE
Genus: *Carpias*
Carpias sp.
1996 Legacy Project (Coles et al., 1997)

Genus: *Cerpias*
Cerpias algicola
1996 Legacy Project (Coles et al., 1997)

Genus: *Janira*
Janira algicola **Miller, 1941**
1927 Ref - Miller, 1941

Family: LIMNORIIDAE
Genus: *Limnoria*
Limnoria sp.
1973 Ref - Evans et al., 1974
1976 Ref - Cooke et al., 1980
1996 Legacy Project (Coles et al., 1997)

Limnoria lignorum
1996 Legacy Project (Coles et al., 1997)

Limnoria tripunctata **Menzies, 1957 Introduced.**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Family: MUNNIDAE
Genus: *Munna*
Munna acarina
1996 Legacy Project (Coles et al., 1997)

Family: SCYPHACIDAE
Genus: *Armadilloniscus*
Armadilloniscus litoralis
1996 Legacy Project (Coles et al., 1997)

Family: SPHAEROMATIDAE
Genus: *Dynamenella*
Dynamenella sp.
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979

Genus: *Exosphaeroma*
Exosphaeroma sp. A sp. **Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Genus: *Paracerceis*
Paracerceis sculpta **(Holmes, 1909) Introduced.**
1968 Ref - Miller, 1968
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979

Genus: *Sphaeroma*
Sphaeroma walkeri **(Stebbing, 1905) Introduced.**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975

Unidentified Sphaeroma
1996 Legacy Project (Coles et al., 1997)

Family: STENETRIIDAE
Genus: *Stenetrium*
Stenetrium medipacificum **Miller, 1941 Indigenous.**
1929 Ref - Miller, 1941

Family: TEREDICOLIDAE
Genus: *Teredicola*
Teredicola typicus **Wilson, 1942**
1976 Ref - Cooke et al., 1980

Order: AMPHIPODA
Unidentified Amphipoda
1979 Ref - AECOS, 1979 Off Pearl Harbor.
2007 This Project
2008 This Project

Family: AMPHILOCHIDAE
Genus: *Amphilochus*
Amphilochus kailua **Barnard, 1970**
1996 Legacy Project (Coles et al., 1997)

Amphilochus likelike **Barnard, 1970**
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Gitanopsis*

Gitanopsis pele **Barnard, 1970**

1996 Legacy Project (Coles et al., 1997)

Family: AMPITHOIDAE

Genus: *Ampithoe*

Ampithoe waialua **Barnard, 1970 Indigenous.**

1996 Legacy Project (Coles et al., 1997)

Genus: *Paragrubia*

Paragrubia vorax **Chevreaux, 1901**

1996 Legacy Project (Coles et al., 1997)

Family: AORIDAE

Genus: *Bemlos*

Bemlos sp. **Indigenous.**

1973 Ref - Evans et al., 1974 Recorded as Lembos.

Bemlos macromanus **Shoemaker, 1925 Indigenous.**

1973 Ref - Evans et al., 1974 Recorded as Lembos macromanus.

1978 Ref - Grovhoug, 1979 Recorded as Lembos macromanus.

1996 Legacy Project (Coles et al., 1997)

Bemlos pualani **(Barnard, 1970)**

1996 Legacy Project (Coles et al., 1997)

Bemlos waipio **(Barnard, 1970)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Grandidierella*

Grandidierella sp.

2008 This Project

Grandidierella bispinosa **Cryptogenic.**

1996 Legacy Project (Coles et al., 1997)

Grandidierella japonica **Introduced.**

1996 Legacy Project (Coles et al., 1997)

Family: CAPRELLIDAE

Unidentified Caprellidae

2008 This Project

Genus: *Caprella* **Hawaiian name(s): `ami kai.**

Caprella scaura **Templeton, 1836 Introduced.**

1929 Spec - BPBM-S 5251

1929 Spec - BPBM-S 5252

1948 Ref - Edmondson & Mansfield, 1948

1973 Ref - Evans et al., 1974

Genus: *Paracaprella*

Paracaprella pusilla **Mayer, 1890**

1978 Ref - Grovhoug, 1979

Family: COLOMASTIGIDAE

Genus: *Colomastix*

Colomastix kapiolani **Barnard, 1970 Indigenous.**

2008 This Project

Colomastix lunalilo **Barnard, 1970 Indigenous.**

1996 Legacy Project (Coles et al., 1997)

2007 This Project

2008 This Project

Colomastix pusilla **Grube, 1855 Indigenous.**

1996 Legacy Project (Coles et al., 1997)

2008 This Project

Family: COROPHIIDAE

Genus: *Corophium*

Corophium sp. **Introduced.**

2007 This Project

Corophium baconi **Shoemaker, 1934 Introduced.**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Corophium insidiosum **Crawford, 1937 Introduced.**

1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Genus: *Ericthonius*

Ericthonius sp.

2008 This Project

Ericthonius brasiliensis **(Dana, 1853) Introduced.**

1938 Ref - Barnard, 1955 Recorded as Ericthonius brasilensis.
1938 Spec - BPBM-S 5947 Identified by J.L. Barnard.
1973 Ref - Evans et al., 1974 Recorded as Ericthonius brasilensis.
1978 Ref - Grovhoug, 1979 Recorded as Ericthonius brasilensis.
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Genus: *Monocorophium*

Monocorophium ascherusicum **(Costa, 1857) Introduced.**

1973 Ref - Evans et al., 1974 Recorded as Corophium acherusicum.
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: GAMMARIDAE

Genus: *Elasmopus*

Elasmopus sp. **Indigenous.**

2008 This Project

Elasmopus diplonyx **Schellenberg, 1938**

1996 Legacy Project (Coles et al., 1997)

Elasmopus ecuadorensis hawaiensis **Schellenberg, 1938**

1973 Ref - Evans et al., 1974

Elasmopus molokai **Barnard, 1970**

1996 Legacy Project (Coles et al., 1997)

Elasmopus pectenicrus **(Bate, 1862)**

1937 Ref - Barnard, 1955 Off Pearl Harbor. Recorded as Elasmopus pectinicrus.
1937 Spec - BPBM-S 5993 Identified by J.L. Barnard.
1944 Ref - Barnard, 1970 Off Pearl Harbor. Recorded as Elasmopus pectinicrus.
1948 Ref - Barnard, 1970 Recorded as Elasmopus pectinicrus.
1948 Spec - BPBM-S 5994 Identified by J.L. Barnard.
1948 Spec - BPBM-S 8717 Drydock. Identified by J.L. Barnard.
1948 Spec - BPBM-S 8718 Drydock. Identified by J.L. Barnard.
1948 Spec - BPBM-S 8719 Drydock. Identified by J.L. Barnard.
1950 Spec - BPBM-S 5995 Identified by J.L. Barnard.
1950 Spec - BPBM-S 6010 Identified by J.L. Barnard.

Elasmopus piikoi **Barnard, 1970**

1978 Ref - Grovhoug, 1979

Legacy Project - Species Report (Cont.)

Elasmopus rapax **(Costa, 1853)** **Introduced.**

1948	Ref - Barnard, 1955	
1948	Ref - Barnard, 1970	
1948	Spec - BPBM-S 5989	Identified by J.L. Barnard.
1948	Spec - BPBM-S 5991	Identified by J.L. Barnard.
1950	Spec - BPBM-S 5990	Identified by J.L. Barnard.
1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1996	Legacy Project (Coles et al., 1997)	

Genus: *Eriopisa*

Eriopisa hamakua **Barnard, 1970**

1967	Spec - BPBM-S 7273	Off W end of Pearl Harbor.
1996	Legacy Project (Coles et al., 1997)	

Genus: *Eriopisella*

Eriopisella sechellensis upolu

1996	Legacy Project (Coles et al., 1997)

Genus: *Maera*

Maera sp. **Indigenous.**

2007	This Project

Maera kaiulani **Barnard, 1970**

1967	Spec - BPBM-S 7276	Off W end of Pearl Harbor.

Maera pacifica **Indigenous.**

1996	Legacy Project (Coles et al., 1997)
2008	This Project

Family: HYALIDAE

Genus: *Hyale*

Hyale grandicornis bishopae **Barnard, 1970**

1996	Legacy Project (Coles et al., 1997)

Family: ISAEIDAE

Genus: *Gammaropsis*

Gammaropsis alamoana **Barnard, 1970**

1996	Legacy Project (Coles et al., 1997)

Genus: *Photis*

Photis hawaiensis **Barnard, 1955** **Cryptogenic.**

2008	This Project

Photis hawaiiensis **Barnard, 1955**

1973	Ref - Evans et al., 1974
1978	Ref - Grovhoug, 1979
1996	Legacy Project (Coles et al., 1997)

Family: LEUCOTHOIDAE

Genus: *Leucothoe*

Leucothoe sp.

1973	Ref - Evans et al., 1974

Leucothoe hyhelia **Barnard, 1965** **Indigenous.**

1973	Ref - Evans et al., 1974
1978	Ref - Grovhoug, 1979
1996	Legacy Project (Coles et al., 1997)
2007	This Project
2008	This Project

Leucothoe tridens **Stebbing, 1888**

1996	Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Paraleucothoe flindersi **Stebbing, 1888 Cryptogenic.**
1996 Legacy Project (Coles et al., 1997)

Family: LILJEBORGIIDAE
Genus: *Liljeborgia*
Liljeborgia heeia **Baranard, 1970**
1996 Legacy Project (Coles et al., 1997)

Family: LYSIANASSIDAE
Genus: *Lysianassa*
Lysianassa ewa **Barnard, 1970 Indigenous.**
2008 This Project

Family: PACHYNIDAE
Unidentified Pachynidae
2007 This Project

Family: PODOCERIDAE
Genus: *Podocerus*
Podocerus brasiliensis **(Dana, 1853) Introduced.**
Unknown Spec - BPBM-S 5964 Identified by J.L. Barnard.
1938 Ref - Barnard, 1955
1938 Spec - BPBM-S 5959 Identified by J.L. Barnard.
1948 Ref - Barnard, 1955
1948 Spec - BPBM-S 5958 Identified by J.L. Barnard.
1948 Spec - BPBM-S 5960 Identified by J.L. Barnard.
1950 Spec - BPBM-S 5961 Identified by J.L. Barnard.
1951 Ref - Barnard, 1955
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Podocerus talegus lawai
1996 Legacy Project (Coles et al., 1997)

Family: STENOTHOIDAE
Unidentified Stenothoidae
2008 This Project

Genus: *Stenothoe*
Stenothoe cattai
1950 Spec - BPBM-S 5966 Identified by J.L. Barnard.

Stenothoe gallensis **Walker, 1904 Introduced.**
1937 Ref - Barnard, 1955
1944 Ref - Barnard, 1955 Off Pearl Harbor.
1948 Spec - BPBM-S 5965 Identified by J.L. Barnard.
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Stenothoe valida **Dana, 1853 Cryptogenic.**
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Order: DECAPODA
Unidentified Caridea
1996 Legacy Project (Coles et al., 1997)

Family: ALPHEIDAE
Unidentified Alpheidae
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Alpheopsis*

Alpheopsis equalis **Coutiere, 1896**

1973	Ref - Evans et al., 1974	

Genus: *Alpheus*

Alpheus sp.

1973	Ref - Evans et al., 1974	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	

Alpheus sp. 1

1987	Ref - Brewer & Assoc., 1987	Recorded as Alpheus sp. 1.

Alpheus brevipes **De Haan, 1849**

1996	Legacy Project (Coles et al., 1997)	

Alpheus collumianus **Stimpson, 1860**

1996	Legacy Project (Coles et al., 1997)	

Alpheus crassimanus **Heller, 1865**

1929	Spec - BPBM-S 8928	Identified by Banner.
1938	Spec - BPBM-S 6442	Identified by A.H. Banner.

Alpheus diadema **Dana, 1852**

1973	Ref - Evans et al., 1974	

Alpheus gracilipes **Stimpson, 1860**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	

Alpheus gracilis simplex **(Banner, 1953)**

1973	Ref - Evans et al., 1974	

Alpheus heeia **Banner & Banner, 1974**

1973	Ref - Evans et al., 1974	

Alpheus lanceloti **Coutiere, 1905**

1973	Ref - Evans et al., 1974	

Alpheus lobidens

1996	Legacy Project (Coles et al., 1997)	

Alpheus lobidens polynesica **Banner & Banner, 1974**

1973	Ref - Evans et al., 1974	

Alpheus lottini **Guèrin, 1829**

1996	Legacy Project (Coles et al., 1997)	

Alpheus mackayi **Banner & Banner, 1974**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2007	Ref - Brock, 2007	

Alpheus pacificus **Dana, 1852**

1947	Spec - BPBM-S 5302	
1947	Spec - BPBM-S 5317	
1948	Spec - BPBM-S 5337	

Alpheus paracrinitus **Miers, 1881**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	

Alpheus paralcyone **Coutiere, 1905**

1973	Ref - Evans et al., 1974	

Alpheus platyunguiculatus **(Banner, 1953)**
1973 Ref - Evans et al., 1974

Alpheus rapacida **deMan, 1911**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Alpheus rapax **Fabricius, 1798**
1973 Ref - Evans et al., 1974

Genus: *Leptalpheus*
Leptalpheus pacificus **Banner & Banner, 1974**
1972 Spec - BPBM-S 8550
1973 Ref - Evans et al., 1974

Genus: *Metalpheus*
Metalpheus paragracilis **(Coutière, 1897)**
1996 Legacy Project (Coles et al., 1997)

Genus: *Synalpheus*
Synalpheus bituberculatus **deMan, 1911**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Synalpheus pachymeris **Coutiere, 1905**
1973 Ref - Evans et al., 1974

Synalpheus paraneomeris **Coutière, 1905**
1996 Legacy Project (Coles et al., 1997)

Synalpheus streptodactylus **Coutiere Indigenous. Common name(s): Snapping Shrimp.**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Synalpheus thai **Banner & Banner, 1966 Indigenous. Common name(s): Snapping Shrimp.**
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Unidentified Synalpheus
1996 Legacy Project (Coles et al., 1997)

Family: AXIIDAE
Genus: *Enoplometopus*
Enoplometopus occidentalis **(Randall) Common name(s): Western Lobster; Hawaiian name(s): `opae; ula.**
1973 Ref - Evans et al., 1974

Family: CALAPPIDAE
Genus: *Calappa* **Hawaiian name(s): pokipoki; papai pokipoki.**
Calappa gallus **(Herbst, 1803)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Calappa hepatica **(Linnaeus, 1767) Common name(s): Hepatic Box Crab; Hawaiian name(s): pokipoki;**
pokipoki `au moana; pokipoki kuapa`a; popoki.
1973 Ref - Evans et al., 1974

Genus: *Cryptosoma*
Cryptosoma granulosum **Alcock**
Unknown Spec - BPBM-S 1500

Family: CALLIANASSIDAE
Genus: *Callianassa*
Callianassa sp.
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Callianassa variabilis
1996 Legacy Project (Coles et al., 1997)

Family: CHIROSTYLIDAE
Unidentified Chirostylidae
1982 Spec - BPBM-S 10099 Off Pearl Harbor.

Family: DIOGENIDAE
Genus: *Calcinus*
Calcinus latens **(Randall, 1839)**
1973 Ref - Evans et al., 1974

Family: DROMIIDAE
Genus: *Cryptodromiopsis*
Cryptodromiopsis tridens **Borradaile**
1950 Spec - BPBM-S 5626

Family: DYNOMENIDAE
Genus: *Dynomene*
Dynomene devaneyi **Takeda, 1977**
1982 Spec - BPBM-S 10098 Off Pearl Harbor.

Family: GERYONIDAE
Genus: *Progeryon*
Progeryon guinotae **Crosnier, 1976**
1977 Spec - BPBM-S 10626 3 miles off Pearl Harbor.

Family: GNATHOPHYLLIDAE
Genus: *Gnathophylloides*
Gnathophylloides mammillatus **(Edmondson)**
1973 Ref - Evans et al., 1974 Recorded as Gnathophylloides mammalatus.

Family: GRAPSIDAE
Unidentified Grapsidae
1996 Legacy Project (Coles et al., 1997)

Genus: *Metapograpsus*
Metapograpsus thukuhar **(Owen, 1839)**
1906 Ref - Rathbun , 1906
1929 Spec - BPBM-S 3157
1931 Spec - BPBM-S 3368 Middle Loch.
1939 Spec - BPBM-S 4427
1948 Spec - BPBM-S 5331
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1987 Ref - AECOS, 1987
1993 Ref - Brock, 1994 Recorded as M. messor.
1994 Ref - Brock, 1995 Recorded as M. messor.
1996 Legacy Project (Coles et al., 1997)

Genus: *Metopograpsus*
Metopograpsus messor **(Forskal, 1775) Indigenous. Common name(s): Shore Crab.**
2007 This Project
2008 This Project

Metopograpsus thukuhar **(Owen, 1893) Indigenous. Common name(s): Shore Crab.**
2007 Ref - Brock, 2007 Recorded as M. messor.
2008 This Project

Genus: *Nanosesarma*
Nanosesarma minutum **(De Man, 1887) Introduced.**
1996 Legacy Project (Coles et al., 1997)

Legacy Project - Species Report (Cont.)

Genus: *Pachygrapsus*
Pachygrapsus sp. **Indigenous.**
2008 This Project

Genus: *Plagusia*
Plagusia depressa tuberculata **Lamarck, 1818**
1947 Spec - BPBM-S 5306
1973 Ref - Evans et al., 1974 Off Pearl Harbor. Recorded as Plagusia depressa tuberculata (Lameroux).

Family: HAPALOCARCINIDAE
Genus: *Hapalocarcinus*
Hapalocarcinus marsupialis **Stimpson, 1859**
1996 Legacy Project (Coles et al., 1997)

Family: HIPPOLYTIDAE
Genus: *Hippolysmata*
Hippolysmata sp.
1948 Spec - BPBM-S 6079

Hippolysmata vittata
1936 Spec - BPBM-S 4222
1947 Spec - BPBM-S 5316
1948 Spec - BPBM-S 5330
1948 Spec - BPBM-S 5338
1948 Spec - BPBM-S 5572

Genus: *Leptodius*
Leptodius exaratus **Milne Edwards**
1906 Ref - Rathbun , 1906

Leptodius sanguineus **(H. Milne Edwards, 1834)**
1973 Ref - Evans et al., 1974

Genus: *Lysmata*
Lysmata acicula **(Rathbun)**
1948 Spec - BPBM-S 5329
1973 Ref - Evans et al., 1974

Genus: *Saron*
Saron marmoratus **(Olivier, 1811) Hawaiian name(s): `opae.**
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Genus: *Spirontocaris*
Spirontocaris marmoratus
1950 Spec - BPBM-S 5634

Family: HOMOLIDAE
Genus: *Homola*
Homola ikedai **Sakai, 1879**
1976 Spec - BPBM-S 10637 Entrance to Pearl Harbor; 2.5 miles off Buoy 1.

Genus: *Paromola*
Paromola japonica **Parisi, 1915**
1976 Spec - BPBM-S 10811 Entrance to Pearl Harbor; 2.5 miles off Buoy 1. Identified by Guinot and Forges, 10 January 1990.
1982 Spec - BPBM-S 10072 Off Pearl Harbor dredge spoil site. Identified by Guinot and Forges.

Family: LEUCOSIIDAE
Genus: *Randallia*
Randallia distincta **Rathbun**
1983 Spec - BPBM-S 11187 Mamala Bay; Pearl Harbor disposal site. Identified by E.H. Chave.

Legacy Project - Species Report (Cont.)

Family: MAJIDAE

Genus: *Hyastensus*

Hyastensus spinosus

1996 Legacy Project (Coles et al., 1997)

Genus: *Schizophroidea*

Schizophroidea hilensis **Rathbun, 1906**

1996 Legacy Project (Coles et al., 1997)

Genus: *Schizophrys*

Schizophrys aspera **H. Milne Edwards, 1834 Introduced.**

1950 Spec - BPBM-S 5620

1951 Ref - Edmondson, 1951

Family: OCYPODIDAE

Genus: *Macrophthalmus*

Macrophthalmus telescopicus **(Owen, 1839) Common name(s): Telescope-Eyed Ghost Crab; Hawaiian name(s): maka`aloa; `aloa; `ohiki makaloa.**

1930 Spec - BPBM-S 3476 Middle Loch.

1973 Ref - Evans et al., 1974

1996 Legacy Project (Coles et al., 1997)

Genus: *Ocypode*

Ocypode ceratophthalma **(Pallas, 1872) Common name(s): sand crab; Hawaiian name(s): `ohiki.**

1979 Ref - AECOS, 1979 Off Pearl Harbor.

Ocypode laevis **Dana**

1996 Legacy Project (Coles et al., 1997)

Family: PALAEMONIDAE

Unidentified Palaemonidae

1996 Legacy Project (Coles et al., 1997)

Genus: *Brachycarpus*

Brachycarpus biunguiculatus **(Lucus, 1846)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Conchodytes*

Conchodytes tridacnae **Peters, 1852**

1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Genus: *Harpiliopsis*

Harpiliopsis depressa **(Stimpson, 1860)**

1996 Legacy Project (Coles et al., 1997)

Genus: *Leander*

Leander sp.

1973 Ref - Evans et al., 1974

Genus: *Macrobrachium*

Macrobrachium grandimanus **(Randall) Hawaiian name(s): `opae `oeha`a.**

1922 Spec - BPBM-S 717

Genus: *Palaemon*

Palaemon debelis **Dana, 1852**

1934 Spec - BPBM-S 3833

Palaemon dibilis **Dana, 1852**

1906 Ref - Rathbun , 1906

Palaemon pacificus **(Simpson)**

1996 Legacy Project (Coles et al., 1997)

Palaemon pacificus? **(Simpson)**

1978 Ref - Grovhoug, 1979

Legacy Project - Species Report (Cont.)

Genus: *Palaemonella*

Palaemonella sp.

1973 Ref - Evans et al., 1974

1996 Legacy Project (Coles et al., 1997)

Palaemonella rotumana

1996 Legacy Project (Coles et al., 1997)

Palaemonella tenuipes **Dana, 1852**

1948 Spec - BPBM-S 5339

1987 Ref - AECOS, 1987 Recorded as Palaemonella tenuides.

1996 Legacy Project (Coles et al., 1997)

Palaemonella tenuipes? **Dana, 1852**

1973 Ref - McCain, 1974 Recorded as Palaemonella tenuides.

1973 Ref - McCain, 1975 Recorded as Palaemonella tenuides.

Family: PALINURIDAE

Genus: *Panulirus*

Panulirus marginatus **(Quoy & Gaimard, 1825)**

1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Panulirus penicillatus **(Olivier, 1791)**

1973 Ref - Evans et al., 1974

Family: PANDALIDAE

Genus: *Heterocarpus*

Heterocarpus sp.

1982 Spec - BPBM-S 10095 Off Pearl Harbor dredge spoil site. Identified by D.M. Devaney.

Heterocarpus ensifer **Milne-Edwards**

1983 Spec - BPBM-S 11149 Mamala Bay; Pearl Harbor disposal site. Identified by R.M. Moffitt.

Genus: *Plesionika*

Plesionika sp.

1982 Spec - BPBM-S 10096 Off Pearl Harbor dredge spoil site; in vicinity of hard outcrop. Identified by D.M. Devaney.

Plesionika alcocki **(Anderson)**

1983 Spec - BPBM-S 11150 Mamala Bay; Pearl Harbor disposal site.

Family: PARTHENOPIDAE

Genus: *Parthenope*

Parthenope sp. **Indigenous.**

2008 This Project

Parthenope stellata **Rathbun, 1906**

1982 Spec - BPBM-S 10097 Off Pearl Harbor dredge spoil site; in vicinity of hard outcrop. Identified by D.M. Devaney.

Parthenope whitei **(Adams & White)**

1973 Ref - Evans et al., 1974

Family: PORTUNIDAE

Unidentified Portunidae

1996 Legacy Project (Coles et al., 1997)

Genus: *Charybdis*

Charybdis erythrodactyla **(Lamarck) Common name(s): Red-Legged Swimming Crab; Hawaiian name(s): papa`i ako`ako`a.**

1902 Spec - BPBM-S 4991

Charybdis hellerii **(A. Milne Edwards) Introduced.**

1950 Spec - BPBM-S 5622

1950 Ref - Edmondson, 1954

Charybdis orientalis **Dana, 1852**

1902 Spec - BPBM-S 4992

Legacy Project - Species Report (Cont.)

Genus: *Libystes*

Libystes nitidus **A. Milne Edwards, 1868**

1973 Ref - Evans et al., 1974

Genus: *Podophthalmus*

Podophthalmus vigil **(Weber, 1795) Common name(s): Long-Eyed Swimming Crab; Hawaiian name(s): mo`ala.**

1906 Ref - Rathbun , 1906
1973 Ref - Evans et al., 1974 Recorded as Podophthalmus vigil (Fabricus).
2006 Ref - Smith et al., 2006

Genus: *Portunus* **Hawaiian name(s): `ala`eke.**

Portunus longispinosus **(Dana, 1852)**

1973 Ref - Evans et al., 1974 Recorded as Portunus longispinosus Rathbun.
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Portunus sanguinolentus **(Herbst, 1899) Common name(s): Blood-Spotted Swimming Crab; Hawaiian name(s): kuhonu; papa`i kuahonu; kuohonu.**

1973 Ref - Evans et al., 1974
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007

Genus: *Scylla*

Scylla serrata **(Forsskål, 1775) Introduced. Common name(s): Serrate Swimming Crab; Samoan Crab; Mangrove Crab; Red Crab.**

1973 Ref - Evans et al., 1974 Recorded as Scylla serrata de Man.
1987 Ref - Brewer & Assoc., 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Genus: *Thalamita*

Thalamita admete **(Herbst, 1803)**

1973 Ref - Evans et al., 1974

Thalamita crenata **Latreille, 1900**

1973 Ref - Evans et al., 1974
1987 Ref - AECOS, 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Thalamita crenata? **Latreille, 1900**

1950 Spec - BPBM-S 5621

Thalamita dakini **Montgomerey, 1931 Indigenous.**

2008 This Project

Thalamita edwardsi

1950 Spec - BPBM-S 5619
2007 Ref - Brock, 2007

Thalamita edwardsi?

1948 Spec - BPBM-S 5335

Thalamita integra **Dana, 1852 Indigenous.**

1915 Spec - BPBM-S 1590
1916 Spec - BPBM-S 741
1922 Spec - BPBM-S 1597
1922 Spec - BPBM-S 718

1922 Spec - BPBM-S 724
1929 Spec - BPBM-S 3155
1931 Spec - BPBM-S 3343
1931 Spec - BPBM-S 3370 Middle Loch.
1938 Spec - BPBM-S 4418
1938 Spec - BPBM-S 4478
1939 Spec - BPBM-S 4426
1947 Spec - BPBM-S 5305
1947 Spec - BPBM-S 5312
1948 Spec - BPBM-S 5322
1948 Spec - BPBM-S 5332
1948 Spec - BPBM-S 5334
1950 Spec - BPBM-S 5618
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1987 Ref - Brewer & Assoc., 1987
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007
2008 This Project

Thalamita medipacifica **Edmondson, 1954**
1923 Spec - BPBM-S 3210

Thalamita quadridens
1950 Spec - BPBM-S 5623

Unidentified Thalamita
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: RANINIDAE
Genus: *Ranina*
Ranina ranina **Linnaeus, 1758**
1902 Spec - BPBM-S 4993

Family: SCYLLARIDAE
Genus: *Parribacus*
Parribacus antarcticus **(Lund, 1793) Common name(s): Antarctic Slipper Lobster; Hawaiian name(s): ula papapa.**

1973 Ref - Evans et al., 1974 Off Pearl Harbor.

Genus: *Scyllarides*
Scyllarides squamosus **(Milne Edwards, 1837)**
1973 Ref - Evans et al., 1974
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Family: SERGESTIDAE
Genus: *Lucifer*
Lucifer sp.
1973 Ref - Evans et al., 1974

Lucifer chacei **Bowman, 1966**
1978 Ref - Grovhoug, 1979

Family: STENOPODIDAE
Genus: *Stenopus*
Stenopus hispidus **(Olivier, 1811) Indigenous. Common name(s): Banded Shrimp; Hawaiian name(s): `opae huna.**

1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

2008 This Project

Family: XANTHIDAE

Unidentified Xanthidae

1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)
2007 This Project

Genus: *Atergatopsis*

Atergatopsis immigrans **(Edmondson, 1962) Introduced.**

1950 Ref - Edmondson, 1962 Recorded as Neoliomera immigrans.

Genus: *Carpilodes*

Carpilodes bellus **(Dana, 1852)**

1916 Spec - BPBM-S 740
1973 Ref - Evans et al., 1974

Carpilodes ruber **A. Milne Edwards, 1865**

1906 Ref - Rathbun , 1906

Genus: *Chlorodiella*

Chlorodiella laevissima **(Dana, 1852)**

1973 Ref - Evans et al., 1974

Genus: *Etisus*

Etisus electra **(Herbst, 1801)**

1937 Spec - BPBM-S 4382
1973 Ref - Evans et al., 1974

Etisus laevimanus **(Randall, 1839)**

Unknown Spec - BPBM-S 10394
1906 Ref - Rathbun , 1906
1929 Spec - BPBM-S 3276
1931 Spec - BPBM-S 3342
1931 Spec - BPBM-S 3369 Middle Loch.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Glabropilumnus*

Glabropilumnus seminudus **(Miers, 1884) Introduced.**

1950 Spec - BPBM-S 5640 Pearl Harbor drydock.
1950 Ref - Edmondson, 1952 Pearl Harbor drydock.
1962 Ref - Edmondson, 1962
1973 Ref - Evans et al., 1974

Genus: *Liocarpilodes*

Liocarpilodes binnguis

1996 Legacy Project (Coles et al., 1997)

Liocarpilodes integerrimus **(Dana, 1852)**

1973 Ref - Evans et al., 1974

Genus: *Lophozozymus*

Lophozozymus sp.

1987 Ref - Brewer & Assoc., 1987

Lophozozymus dodone **(Herbst, 1801)**

1973 Ref - Evans et al., 1974

Genus: *Madaeus*

Madaeus simplex **(A. Milne Edwards, 1873)**

1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Genus: ***Medaeus***

Medaeus simplex

1929	Spec - BPBM-S 3162	

Genus: ***Neoliomera***

Neoliomera immigrans **Edmondson, 1962 Introduced.**

1950	Spec - BPBM-S 5625	
1962	Ref - Edmondson, 1962	

Genus: ***Neopanope***

Neopanope sp.

1929	Spec - BPBM-S 3437	

Genus: ***Panopeus***

Panopeus herbstii **Milne-Edwards Introduced.**

1947	Spec - BPBM-S 5314	
1947	Ref - Edmondson, 1962	Recorded as Panopeus herpstii.

Panopeus lacustris **Desbonne, 1867 Introduced.**

2008	This Project	

Panopeus pacificus **(Edmondson, 1931) Introduced.**

1929	Spec - BPBM-S 3280	
1929	Spec - BPBM-S 3435	
1929	Ref - Edmondson, 1931	
1930	Spec - BPBM-S 5298	
1930	Ref - Edmondson, 1962	
1937	Spec - BPBM-S 4397	Identified by Takeda, Aug. 1979.
1947	Spec - BPBM-S 5304	Identified by Edmondson.
1948	Spec - BPBM-S 5325	
1948	Spec - BPBM-S 5333	
1948	Spec - BPBM-S 5336	
1948	Spec - BPBM-S 6135	
1949	Spec - BPBM-S 5578	Middle Loch.
1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Genus: ***Paramedeus***

Paramedeus simplex **(Milne Edwards, 1873)**

1996	Legacy Project (Coles et al., 1997)	

Genus: ***Phymodius***

Phymodius sp. **Indigenous.**

2008	This Project	

Phymodius nitidus **(Dana, 1852) Indigenous.**

1929	Spec - BPBM-S 3161	
1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Phymodius ungulatus **Milne Edwards, 1834**

1996	Legacy Project (Coles et al., 1997)	

Genus: ***Pilumnus***

Pilumnus longicornis **Hilgendorf, 1878**

1950	Spec - BPBM-S 5624	

Pilumnus minutus **De Haan, 1833**

1996	Legacy Project (Coles et al., 1997)	

Pilumnus oahuensis **Edmondson, 1931 Introduced. Common name(s): Pilumnid Crab.**

1929	Spec - BPBM-S 3279	
1929	Spec - BPBM-S 3432	
1929	Ref - Edmondson, 1931	
1930	Ref - Edmondson, 1962	
1931	Spec - BPBM-S 3433	
1932	Spec - BPBM-S 3852	
1947	Spec - BPBM-S 5303	
1948	Spec - BPBM-S 5324	
1950	Spec - BPBM-S 5613	
1950	Spec - BPBM-S 6131	
1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1987	Ref - Brewer & Assoc., 1987	
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	
2008	This Project	

Pilumnus taeniola **Rathbun, 1906 Indigenous.**

2008	This Project	

Genus: *Platypodia*

Platypodia eydouxii **(A. Milne Edwards, 1865)**

1916	Spec - BPBM-S 735	
1929	Spec - BPBM-S 3156	
1931	Spec - BPBM-S 3344	
1973	Ref - Evans et al., 1974	Recorded as Platypodia eydouxi.
1996	Legacy Project (Coles et al., 1997)	

Platypodia semigranosa

1950	Spec - BPBM-S 5638	

Unidentified Platypodia

1996	Legacy Project (Coles et al., 1997)	

Genus: *Trapezia*

Trapezia guttata **Rüppell, 1830**

1973	Ref - Evans et al., 1974	Off Pearl Harbor.

Trapezia intermedia **(Miers)**

1996	Legacy Project (Coles et al., 1997)	

Trapezia wardi **Serène, 1970**

1996	Legacy Project (Coles et al., 1997)	

Genus: *Xanthias*

Xanthias sp.

1973	Ref - Evans et al., 1974	

Order: STOMATOPODA

Family: GONODACTYLIDAE

Genus: *Gonodactylaceus*

Gonodactylaceus falcatus **(Forsskål, 1775) Introduced. Common name(s): Snapping Shrimp.**

1973	Ref - Evans et al., 1974	Recorded as Gonodactylus falcatus.
1987	Ref - AECOS, 1987	Recorded as Gonodactylus falcatus.
1993	Ref - Brock, 1995	Recorded as Gonodactylus alohoa.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	Recorded as Gonodactylaceus mutates.
2007	Ref - Brock, 2007	Recorded as Gonodactylus falcatus.

2007 This Project

Genus: *Pseudosquilla*
Pseudosquilla ciliata **(Fabricius, 1787) Hawaiian name(s): aloalo.**
1938 Spec - BPBM-S 4567
1973 Ref - Evans et al., 1974 Recorded as Pseudosquilla ciliata Miers.
1996 Legacy Project (Coles et al., 1997)

Family: LYSIOSQUILLIDAE
Genus: *Lysiosquilla*
Lysiosquilla maculatus **(Fabricius.)**
1923 Spec - BPBM-S 2522

Genus: *Lysiosquillina*
Lysiosquillina maculata **(Fabricuis, 1793)**
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007

Family: SQUILLIDAE
Genus: *Squilla*
Squilla sp.
1986 Ref - Lenihan, 1990

Class: INSECTA
Order: COLLEMBOLA
Unidentified Collembola
1996 Legacy Project (Coles et al., 1997)

Phylum: SIPUNCULA
Class: SIPUNCULIDA
Unidentified Sipunculida
1996 Legacy Project (Coles et al., 1997)

Family: PHASCOLOSOMATIDAE
Genus: *Phascolosoma*
Phascolosoma perlucens **Baird, 1868**
1973 Ref - Evans et al., 1974 Recorded as Phascolosoma dentigerum (Selenka, deMan & Bulo.

Phascolosoma stephensoni **(Stephen, 1942) Indigenous.**
2007 This Project

Phylum: BRYOZOA
Unidentified Bryozoa
Unknown Spec - BPBM-K 649
1975 Spec - BPBM-K 684
1976 Spec - BPBM-K 661 Hospital Point.
1976 Ref - Cooke et al., 1980
2007 This Project

Family: CLEIDOCHASMATIDAE
Genus: *Diaperoforma*
Diaperoforma sp. **Indigenous.**
2008 This Project

Class: GYMNOLAEMATA
Order: CTENOSTOMATA
Family: VESICULARIIDAE
Genus: *Amathia*
Amathia sp.
1950 Spec - BPBM-K 214
1972 Ref - Long, 1974 Off Pearl Harbor.

Legacy Project - Species Report (Cont.)

Amathia sp.?

1947 Spec - BPBM-K 234

Amathia distans **Busk, 1886 Introduced. Common name(s): Bushy Bryozoan.**

1948 Spec - BPBM-K 207
1948 Spec - BPBM-K 210
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Amathia distans? **Busk, 1886 Introduced. Common name(s): Bushy Bryozoan.**

Unknown Spec - BPBM-K 455

Genus: *Bowerbankia*

Bowerbankia sp.

1972 Ref - Long, 1974 Off Pearl Harbor.

Genus: *Zoobotryon*

Zoobotryon sp.

1996 Legacy Project (Coles et al., 1997)

Zoobotryon verticillatum **(Della Chiaje) Introduced.**

1921 Spec - BPBM-K 236
1940 Spec - BPBM-K 233
1940 Spec - BPBM-K 310
1948 Spec - BPBM-K 216
1948 Spec - BPBM-K 346
1975 Spec - BPBM-K 601 Merry Point; off Fuel Pier Array. Identified by J. Grovhoug.
2008 This Project

Order: CYCLOSTOMATA

Family: LICHENOPORIDAE

Genus: *Lichenopora*

Lichenopora sp.

1972 Ref - Long, 1974

Family: TUBULIPORIDAE

Genus: *Tubulipora*

Tubulipora sp.

1972 Ref - Long, 1974 Off Pearl Harbor.

Order: CHEILOSTOMATA

Family: AETEIDAE

Genus: *Aetea*

Aetea rufopuncta

1916 Spec - BPBM-S 736

Aetea truncata **(Landsborough, 1852) Introduced.**

1972 Ref - Long, 1974 Off Pearl Harbor.
1975 Ref - Grovhoug, 1976
1996 Legacy Project (Coles et al., 1997)

Family: BEANIIDAE

Genus: *Beania*

Beania discodermiae **(Ortmann, 1890)**

1972 Ref - Long, 1974 Off Pearl Harbor.

Family: BUGULIDAE

Genus: *Bugula*

Bugula sp.

1929 Spec - BPBM-K 232
1978 Ref - Grovhoug, 1979

1996	Legacy Project (Coles et al., 1997)	

Bugula dentata **(Lamauroux, 1816) Introduced. Common name(s): Blue Fan Bryozoan.**

Unknown	Spec - BPBM-K 466	
1940	Spec - BPBM-K 223	
1940	Spec - BPBM-K 226	
1940	Spec - BPBM-K 230	
1946	Spec - BPBM-K 231	
1948	Spec - BPBM-K 208	
1948	Spec - BPBM-K 227	
1948	Spec - BPBM-K 229	
1950	Spec - BPBM-K 212	
1950	Spec - BPBM-K 228	
1972	Ref - Long, 1974	Off Pearl Harbor. Recorded as Bugula californica.
1973	Ref - Evans et al., 1974	Recorded as Bugula californica.
1975	Ref - Grovhoug, 1976	Recorded as Bugula californica.
1993	Ref - Brock, 1994	Recorded as Bugula californica.
1994	Ref - Brock, 1995	Recorded as Bugula californica.
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Bugula neritina **(Linnaeus, 1758) Introduced. Common name(s): Red Fan Bryozoan.**

Unknown	Spec - BPBM-K 240	
1921	Spec - BPBM-K 235	
1921	Spec - BPBM-K 239	
1935	Spec - BPBM-K 217	
1935	Spec - BPBM-K 220	
1935	Ref - Edmondson, 1944	
1935	Ref - Ingram, 1937	
1940	Spec - BPBM-K 218	
1940	Spec - BPBM-K 219	
1940	Spec - BPBM-K 224	
1940	Spec - BPBM-K 225	
1940	Spec - BPBM-K 238	
1947	Spec - BPBM-K 237	
1948	Spec - BPBM-K 206	
1948	Spec - BPBM-K 215	
1950	Spec - BPBM-K 209	
1950	Spec - BPBM-K 211	
1950	Spec - BPBM-K 213	
1972	Ref - Long, 1974	
1973	Ref - Evans et al., 1974	
1975	Ref - Grovhoug, 1976	
1978	Ref - Grovhoug, 1979	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Family: CELLEPORARIIDAE

Genus: *Celleporaria*

Celleporaria sp. **Indigenous.**

2007	This Project	
2008	This Project	

Celleporaria costazii **(Audouin, 1826)**

1972	Ref - Long, 1974	Off Pearl Harbor.

Legacy Project - Species Report (Cont.)

Genus: *Holoporella*
Holoporella sp.
1975 Ref - Grovhoug, 1976
1978 Ref - Grovhoug, 1979

Family: CELLEPORIDAE
Genus: *Cellepora*
Cellepora vagans **(Busk, 1855)**
1972 Ref - Long, 1974 Recorded as Celleporaria vagans.

Family: CRIBRILINIDAE
Genus: *Cribrilaria*
Cribrilaria radiata **(Moll, 1803)**
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: MICROPORELLIDAE
Genus: *Microporella*
Microporella ciliata **(Pallas, 1766)**
1972 Ref - Long, 1974

Family: MUCRONELLIDAE
Genus: *Parasmittina*
Parasmittina sp.
1972 Ref - Long, 1974
1996 Legacy Project (Coles et al., 1997)

Parasmittina spathulata **(Smitt, 1873)**
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: RETEPORIDAE
Genus: *Reteporellina*
Reteporellina denticulata **(Busk, 1884)**
1972 Ref - Long, 1974 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Genus: *Rhynchozoon*
Rhynchozoon sp.
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: SAVIGNYELLIDAE
Genus: *Savignyella*
Savignyella lafontii **(Audouin, 1826)**
1972 Ref - Long, 1974
1996 Legacy Project (Coles et al., 1997)

Family: SCHIZOPORELLIDAE
Genus: *Schizoporella*
Schizoporella cf. errata **(Waters, 1878) Introduced. Common name(s): Erratic Bryozoan.**
Unknown Spec - BPBM-K 253
1973 Ref - McCain, 1974 Recorded as Schizoporella sp..
1973 Ref - McCain, 1975 Recorded as Schizoporella sp..
1985 Ref - Hurlbut, 1990 Recorded as S. unicornis (Johnston, 1847).
1986 Ref - Lenihan, 1990 Recorded as Schizoporella errata.
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Schizoporella unicornis **(Johnston, 1847) Introduced.**
1935 Ref - Edmondson, 1944
1935 Ref - Ingram, 1937
1972 Ref - Long, 1974
1975 Ref - Grovhoug, 1976
1993 Ref - Brock, 1994 Recorded as S. unicornis (Johnston, 1847).

1994 Ref - Brock, 1995 Recorded as S. unicornis (Johnston, 1847).
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007

Unidentified Schizoporella
1996 Legacy Project (Coles et al., 1997)

Family: SCRUPOCELLARIIDAE
Genus: *Scrupocellaria*
Scrupocellaria sinuosa **Canu & Bassler, 1927**
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: STEGANOPORELLIDAE
Genus: *Steganoporella*
Steganoporella sp.
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: THALAMOPORELLIDAE
Genus: *Thalamoporella*
Thalamoporella hawaiiana **Soule & Soule, 1970**
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: VITTATICELLIDAE
Genus: *Vittaticella*
Vittaticella elegans **(Busk, 1852)**
1972 Ref - Long, 1974 Off Pearl Harbor.

Family: WATERISPORIDAE
Genus: *Waterispora*
Waterispora edmondsoni **Soule & Soule, 1968 Introduced.**
1972 Ref - Long, 1974
1975 Ref - Grovhoug, 1976
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Genus: *Watersipora*
Watersipora edmondsoni **Soule and Soule, 1968 Introduced.**
2008 This Project

Phylum: ECHINODERMATA
Class: STELLEROIDEA
Order: PLATYASTERIDA
Family: LUIDIIDAE
Genus: *Luidia*
Luidia hystrix **Fisher, 1906 Hawaiian name(s): la kai; pe`a.**
1902 Spec - BPBM-W 1023
1902 Spec - BPBM-W 654

Order: VALVATIDA
Family: GONIASTERIDAE
Genus: *Plinthaster*
Plinthaster ceramoidea **(Fisher, 1906)**
1978 Spec - BPBM-W 3014 Off Pearl Harbor; dredge spoil site. Identified by D.M. Devaney.

Family: OPHIODIASTERIDAE
Genus: *Linckia*
Linckia multifora **(Lamarck, 1816)**
1972 Spec - BPBM-W 2010 150 yds NW from Buoy "1" at harbor entrance. Identified by D.M. Devaney.

Family: OREASTERIDAE
Genus: *Culcita* **Hawaiian name(s): pe`a.**
Culcita novaeguineae f. arenosa
Unknown Spec - BPBM-W 627

1902 Spec - BPBM-W 1026

Culcita novaeguineae f. nesiotis **Fisher, 1925**

Unknown Spec - BPBM-W 626

Order: FORCIPULATIDA
Family: ASTERIIDAE
Genus: *Distolasterias*
Distolasterias euplecta **Fisher, 1906**

1982 Spec - BPBM-W 3028 Off Pearl Harbor; dredge spoil site. Identified by D.M. Devaney, 1982.

Order: OPHIURIDA
Family: AMPHIURIDAE
Genus: *Amphipholis*
Amphipholis squamata **(Delle Chiaje, 1829)**

1972 Spec - BPBM-W 2480 On the N dolphin piling (wooden) near the sound measurement facility. Identified by D.M. Devaney.

1973 Ref - Evans et al., 1974

1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Ophionereis*
Ophionereis porrecta **Lyman**

1967 Spec - BPBM-W 2579 Ewa End.

Family: OPHIACTIDAE
Genus: *Histampica*
Histampica cythera **(A. H. Clark, 1949)**

1982 Spec - BPBM-W 3011 Off Pearl Harbor; dredge spoil site. Identified by D.M. Devaney. May 1982.

1982 Spec - BPBM-W 3052 Off Pearl Harbor; dredge spoil site. Identified by D.M. Devaney, 13 Oct 1982.

Genus: *Ophiactis*
Ophiactis sp.

1982 Spec - BPBM-W 3012 Off Pearl Harbor; dredge spoil site. Identified by D.M. Devaney. May 1982.

Ophiactis dyscrita **Clark, 1911**

1949 Ref - Clark, 1949 USNM 6927.

Ophiactis modesta **Brock, 1888**

1938 Spec - BPBM-W 1031

1942 Ref - Ely, 1942

Ophiactis savignyi **(Müller & Troschel, 1842) Cryptogenic. Common name(s): Sponge Brittle Star.**

Unknown Spec - BPBM-W 370

1929 Spec - BPBM-W 766

1933 Ref - Edmondson, 1933

1937 Spec - BPBM-W 957

1938 Spec - BPBM-W 965

1939 Spec - BPBM-W 969

1942 Ref - Ely, 1942

1949 Spec - BPBM-W 1180

1949 Ref - Clark, 1949

1973 Ref - Evans et al., 1974

1973 Ref - McCain, 1974

1973 Ref - McCain, 1975

1979 Ref - AECOS, 1979 Off Pearl Harbor.

1987 Ref - AECOS, 1987

1996 Legacy Project (Coles et al., 1997)

2007 This Project

2008 This Project

Legacy Project - Species Report (Cont.)

Family: OPHIOCOMIDAE
Genus: *Ophiocoma*
Ophiocoma erinaceus **Indigenous. Common name(s): Spiny Brittle Star.**
2008 This Project

Ophiocoma sexradia **(Duncan, 1887)**
1973 Ref - Evans et al., 1974

Family: OPHIOTHRICIDAE
Genus: *Macrophiothrix*
Macrophiothrix demessa **(Lyman)**
1967 Spec - BPBM-W 2580 Ewa End.

Class: ECHINOIDEA
Order: CIDAROIDA
Family: CIDARIDAE
Genus: *Eucidaris*
Eucidaris metularia **(Lamarck, 1816) Indigenous. Common name(s): Ten-lined Urchin; Hawaiian name(s):**

ha`ue`ue; peni.
1973 Ref - Evans et al., 1974
2008 This Project

Order: DIADEMATOIDA
Family: DIADEMATIDAE
Genus: *Diadema*
Diadema paucispinum **Agassiz, 1863 Indigenous. Common name(s): Long-spined Urchin; Hawaiian name(s):**

wana hālula.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Genus: *Echinothrix*
Echinothrix calamaris **(Pallas, 1774) Indigenous. Common name(s): Banded Urchin.**
2006 Ref - Smith et al., 2006
2008 This Project

Echinothrix diadema **(Linnaeus, 1758) Indigenous. Common name(s): Blue-Black Sea Urchin.**
2006 Ref - Smith et al., 2006
2008 This Project

Order: TEMNOPLEUROIDA
Family: TEMNOPLEURIDAE
Genus: *Mespilia*
Mespilia globulus **(Linnaeus, 1758)**
1950 Spec - BPBM-W 1200 From boat in dry dock.. Identified by D.M. Devaney.

Family: TOXOPNEUSTIDAE
Genus: *Pseudoboletia*
Pseudoboletia indiana **(Michelin, 1863)**
1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Tripneustes*
Tripneustes gratilla **(Linnaeus, 1758) Indigenous. Common name(s): Collector Urchin; Hawaiian name(s):**

hawa`e; hawa`e maoli; hawa`e po`ohina.
1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Order: ECHINOIDA
Family: ECHINOMETRIDAE
Genus: *Echinometra*
Echinometra mathaei **(de Blainville, 1825) Indigenous. Common name(s): Rock-boring Urchin.**
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

2008 This Project

Genus: *Heterocentrotus*

Heterocentrotus mammillatus **(Linnaeus, 1758) Indigenous. Common name(s): Red Pencil Urchin; Hawaiian name(s): ha`uke`uke iwi loloa; ha`ue`ue; `ina `ula; ha`uke`uke.**

1973 Ref - Evans et al., 1974

Class: HOLOTHUROIDEA
Order: ASPIDOCHIROTIDA
Family: HOLOTHURIIDAE

Genus: *Actinopyga*

Actinopyga mauritiana **(Quoy & Gaimard, 1833)**

1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Genus: *Holothuria*

Holothuria sp. **Indigenous.**

2008 This Project

Holothuria (Lessonothuria) pardalis **Selenka, 1867 Indigenous. Common name(s): Leopard Sea Cucumber.**

2008 This Project

Holothuria atra **Jager, 1833**

1996 Legacy Project (Coles et al., 1997)

Holothuria impatiens **Forsskål, 1775**

1979 Ref - AECOS, 1979 Off Pearl Harbor.

Holothuria pervicax **(Selenka, 1867)**

1973 Ref - Evans et al., 1974

Genus: *Labidodemas*

Labidodemas semperianum **Selenka, 1867 Indigenous. Common name(s): White Sea Cucumber.**

2008 This Project

Order: APODIDA
Family: SYNAPTIDAE

Genus: *Opheodesoma*

Opheodesoma spectabilis **Fisher, 1907 Indigenous. Common name(s): Conspicuous Sea Cucumber.**

1907	Ref - Fisher, 1907	Recorded as Ophiodesoma spectabilis. USNM 21226.
1955	Spec - BPBM-W 1234	On beach.
1973	Ref - Evans et al., 1974	Recorded as Ophiodesoma spectabilis.
1987	Ref - AECOS, 1987	Recorded as Ophiodesoma spectabilis.
1993	Ref - Brock, 1994	Recorded as Ophiodesoma spectabilis.
1994	Ref - Brock, 1995	Recorded as Ophiodesoma spectabilis.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	Ref - Brock, 2007	
2007	This Project	
2008	This Project	

Genus: *Polyplectana*

Polyplectana kefersteinii **(Selenka, 1867) Indigenous. Common name(s): Keferstan's Sea Cucumber.**

2008 This Project

Phylum: CHAETOGNATHA
Class: SAGITTOIDEA
Order: APHRAGMOPHORA
Family: PTEROSAGITTIDAE

Genus: *Pterosagitta*

Pterosagitta sp.

1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Family: SAGITTIDAE
Genus: *Sagitta*
Sagitta sp.
1973 Ref - Evans et al., 1974

Sagitta enflata **Grassi, 1883**
1978 Ref - Grovhoug, 1979

Sagitta regularis **Aida, 1897**
1978 Ref - Grovhoug, 1979

Phylum: CHORDATA
Unidentified Chordata
1921 Spec - BPBM-Y 121
1924 Spec - BPBM-Y 112
1929 Spec - BPBM-Y 128
1929 Spec - BPBM-Y 129
1929 Spec - BPBM-Y 130
1942 Spec - BPBM-Y 111
1947 Spec - BPBM-Y 167
1948 Spec - BPBM-Y 171
1948 Spec - BPBM-Y 172
1948 Spec - BPBM-Y 174
1948 Spec - BPBM-Y 176
1948 Spec - BPBM-Y 177
1948 Spec - BPBM-Y 178

Unidentified Urochordata
1996 Legacy Project (Coles et al., 1997)

Class: ASCIDIACEA
Unidentified Ascidiacea
1979 Ref - AECOS, 1979 Off Pearl Harbor.
1996 Legacy Project (Coles et al., 1997)

Order: APLOUSOBRANCHIA
Family: CLAVELINIDAE
Genus: *Clavelina*
Clavelina sp.
1973 Ref - Evans et al., 1974

Family: DIDEMNIDAE
Unidentified Didemnidae
1986 Ref - Lenihan, 1990
1996 Legacy Project (Coles et al., 1997)

Genus: *Didemnum*
Didemnum sp.
1972 Ref - Long, 1974
1985 Ref - Hurlbut, 1990

Didemnum candidum **Savigny, 1816**
2007 Ref - Brock, 2007

Didemnum cf. candidum **Savigny, 1816 Introduced. Common name(s): White Didemnid.**
1985 Ref - Hurlbut, 1990 Recorded as Didemnum candidum.
1993 Ref - Brock, 1994 Recorded as Didemnum candidum.
1994 Ref - Brock, 1995 Recorded as Didemnum candidum.
2007 This Project
2008 This Project

Didemnum edmondsoni **Eldredge, 1966 Indigenous.**
1993 Ref - Brock, 1994

1994 Ref - Brock, 1995
2008 This Project

Didemnum perlucidum **Monniot, 1983 Introduced.**
2007 This Project

Genus: *Diplosoma*
Diplosoma cf. spongiforme **(Giard, 1872) New record for Hawaii. Introduced.**
2008 This Project

Diplosoma listerianum **(Milne-Edwards, 1841) Introduced.**
1975 Ref - Grovhoug, 1976 Recorded as Diplosoma macdonaldi.
1978 Ref - Grovhoug, 1979 Recorded as Diplosoma macdonaldi.
1985 Ref - Hurlbut, 1990
1987 Ref - Brewer & Assoc., 1987 Recorded as Diplosoma macdonaldi.
2008 This Project

Genus: *Tridemnum*
Tridemnum savignyi **(Herdman, 1886)**
1975 Ref - Grovhoug, 1976

Family: POLYCLINIDAE
Unidentified Polyclinidae
1947 Spec - BPBM-Y 168
1948 Spec - BPBM-Y 173
1948 Spec - BPBM-Y 175

Genus: *Polyclinum*
Polyclinum sp. **Indigenous.**
1975 Ref - Grovhoug, 1976

Polyclinum constellatum **Savigny, 1816**
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007

Polyclinum vasculosum **Pizon, 1908**
1920 Ref - Tokioka, 1967 USNM 11755.
1972 Ref - Long, 1974

Order: PHLEBOBRANCHIA
Family: ASCIDIIDAE
Genus: *Ascidia*
Ascidia n. sp. **Known only from Hawaii.**
1996 Legacy Project (Coles et al., 1997)

Ascidia sp. **Indigenous.**
Unknown Spec - BPBM-Y 205 Identified by D.P. Abbott, Nov 1980.
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1976 Spec - BPBM-Y 245 Identified by P. Ching.
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Ascidia sp. B **Introduced.**
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Ascidia interrupta
1993 Ref - Brock, 1994 Recorded as Ascidia interrupta..

1994 Ref - Brock, 1995 Recorded as Ascidia interrupta..

Ascidia melanostoma **(Sluiter, 1885)**
1972 Ref - Long, 1974
1996 Legacy Project (Coles et al., 1997)

Ascidia sp. A **Introduced.**
2007 This Project

Ascidia sydneiensis **(Stimpson, 1855) Introduced. Common name(s): Yellow-green Sea Squirt.**
Unknown Spec - BPBM-Y 217 Scraped from bottom of U.S.S. Dobin. Identified by D.P. Abbott, Nov 1980.
1976 Spec - BPBM-Y 244 Pearl Harbor?. Identified by P. Ching.
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Genus: *Phallusia*
Phallusia nigra **Savigny, 1816 Introduced. Common name(s): Black Sea Squirt.**
1985 Ref - Hurlbut, 1990
1993 Ref - Brock, 1994 Recorded as Ascidia nigra.
1994 Ref - Brock, 1995 Recorded as Ascidia nigra.
1996 Legacy Project (Coles et al., 1997)
2007 Ref - Brock, 2007 Recorded as Ascidia nigra.
2007 This Project
2008 This Project

Family: CIONIDAE
Genus: *Ciona*
Ciona intestinalis **(Linnaeus, 1767) Introduced.**
Unknown Spec - BPBM-Y 218 Scraped from bottom of U.S.S. Dobin. Identified by D.P. Abbott, Nov 1980.
1975 Ref - Grovhoug, 1976
1976 Ref - Cooke et al., 1980

Family: PEROPHORIDAE
Genus: *Perophora*
Perophora sp.
1975 Ref - Grovhoug, 1976

Perophora annectens
1996 Legacy Project (Coles et al., 1997)

Order: STOLIDOBRANCHIA
Family: PYURIDAE
Genus: *Herdmania*
Herdmania sp. **Indigenous.**
2008 This Project

Herdmania mauritiana **(Drasche, 1884) Introduced.**
2008 This Project

Herdmania pallida **(Savigny, 1816) Introduced.**
1972 Ref - Long, 1974 Recorded as Herdmania momus.
1973 Ref - Evans et al., 1974 Recorded as Herdmania momus.
1993 Ref - Brock, 1994 Recorded as Herdmania momus.
1994 Ref - Brock, 1995 Recorded as Herdmania momus.
1996 Legacy Project (Coles et al., 1997)
2007 This Project
2008 This Project

Genus: *Microsomus*
Microcosmus exasperatus **Introduced.**
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Legacy Project - Species Report (Cont.)

Family: STYELIDAE

Genus: *Botrylloides*

Botrylloides sp. **Indigenous.**

1996 Legacy Project (Coles et al., 1997)
2008 This Project

Botrylloides sp. (grey) sp.

1973 Ref - McCain, 1974 Recorded as Botrylloides sp. (grey).
1973 Ref - McCain, 1975 Recorded as Botrylloides sp. (grey).

Botrylloides sp. (red) sp.

1973 Ref - McCain, 1974 Recorded as Botrylloides sp. (red).
1973 Ref - McCain, 1975 Recorded as Botrylloides sp. (red).

Botrylloides nigrum

1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2007 Ref - Brock, 2007

Genus: *Botryllus*

Botryllus sp. **Indigenous.**

1975 Ref - Grovhoug, 1976 Recorded as Botrylloides.
1978 Ref - Grovhoug, 1979 Recorded as Botrylloides.
1996 Legacy Project (Coles et al., 1997)

Genus: *Cnemidocarpa*

Cnemidocarpa irene **(Hartmeyer, 1906) Introduced.**

2008 This Project

Genus: *Polyandrocarpa*

Polyandrocarpa sp. A

1996 Legacy Project (Coles et al., 1997)

Polyandrocarpa sp. B sp.

1996 Legacy Project (Coles et al., 1997)

Polyandrocarpa sagamiensis **Tokioka, 1953 Introduced.**

2008 This Project

Polyandrocarpa zooritensis **Van Name, 1931 Introduced.**

2008 This Project

Genus: *Polycarpa*

Polycarpa sp. **Indigenous.**

2008 This Project

Polycarpa aurita **(Sluiter, 1890) Indigenous.**

2008 This Project

Polycarpa cryptocarpa **(Sluiter, 1885) New record for Hawaii. Cryptogenic.**

2008 This Project

Genus: *Styela*

Styela sp.

1973 Ref - Evans et al., 1974

Styela areoleata **Heller, 1878**

1975 Ref - Grovhoug, 1976

Styela canopus **Savigny, 1816 Introduced.**

2007 This Project
2008 This Project

Styela partita **(Stimson, 1852)**

Unknown Spec - BPBM-Y 228 Scraped from bottom of U.S.S. Dobin. Identified by D.P. Abbott.
1975 Ref - Grovhoug, 1976
1976 Spec - BPBM-Y 239 Identified by P. Ching.

Styela partita? **(Stimson, 1852)**
1929 Spec - BPBM-Y 102

Genus: *Symplegma*
Symplegma sp. **Tokioka, 1949 Indigenous.**
1929 Spec - BPBM-Y 110
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Symplegma oceania **Tokioka, 1961 Introduced.**
1975 Ref - Grovhoug, 1976 Recorded as Symplegma connectans.
1978 Ref - Grovhoug, 1979 Recorded as Symplegma connectans.
1996 Legacy Project (Coles et al., 1997)

Symplegma reptans **Introduced.**
1996 Legacy Project (Coles et al., 1997)

Class: THALIACEA
Order: DOLIOLIDA
Family: DOLIOLIDAE
Genus: *Dolioum*
Dolioum sp.
1973 Ref - Evans et al., 1974

Class: APPENDICULARIA
Order: COPELATA
Family: OIKOPLEURIDAE
Genus: *Oikopleura*
Oikopleura sp.
1973 Ref - Evans et al., 1974

Class: CHONDRICHTHYES
Order: LAMNIFORMES
Family: CARCHARHINIDAE
Genus: *Carcharhinus*
Carcharhinus limbatus **(Valenciennes, 1841)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Genus: *Glyphis*
Glyphis granifera **Pease**
Unknown Spec - BPBM-MO 64518 Ford Island. Catalogue V.

Family: SPHYRNIDAE
Genus: *Sphyrna*
Sphyrna lewini **(Griffith & Smith, 1834)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1987 Ref - Brewer & Assoc., 1987

Order: RAJIFORMES
Family: MYLIOBATIDAE
Genus: *Aetobatus*
Aetobatus nana **(Loman)**
1948 Spec - BPBM-S 7208 Identified by Koichiro Nakamura, 1985.
1948 Spec - BPBM-S 8788 Drydock.

Aetobatus narinari **(Euphrasen, 1790)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1987 Ref - Brewer & Assoc., 1987

Legacy Project - Species Report (Cont.)

Class: ACTINOPTERYGII
Order: ELOPIFORMES
Family: ALBULIDAE
Genus: *Albula*
Albula vulpes **(Linnaeus, 1758)**

1973	Ref - Evans et al., 1974	

Family: ELOPIDAE
Genus: *Elops*
Elops hawaiiensis **Regan, 1909**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
2006	Ref - Smith et al., 2006	Recorded as Elops hawaiensis.

Order: ANGUILLIFORMES
Family: CONGRIDAE
Genus: *Conger*
Conger cinreus marginatus **Valenciennes, 1841**

1973	Ref - Evans et al., 1974	Recorded as C. marginatus.
1978	Ref - Grovhoug, 1979	Recorded as C. cinreus.

Family: MURAENIDAE
Genus: *Gymnothorax*
Gymnothorax sp.

1979	Ref - AECOS, 1979	Off Pearl Harbor.
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	

Gymnothorax flavimarginatus **(Rüppell, 1828)**

1973	Ref - Evans et al., 1974	

Gymnothorax petelli **(Bleeker, 1856)**

1973	Ref - Evans et al., 1974	

Gymnothorax undulatus **(Lacépede, 1803)**

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1978	Ref - Grovhoug, 1979	
1987	Ref - Brewer & Assoc., 1987	
1994	Ref - Brock, 1995	

Order: CLUPEIFORMES
Family: Clupeidae
Genus: *Herklotsichthys*
Herklotsichthys quadrimaculatus **(Rüppell, 1837)**

2006	Ref - Smith et al., 2006	

Family: ENGRAULIDAE
Genus: *Encrasicholina*
Encrasicholina purpurea **Fowler, 1900**

1961	Ref - Au, 1965	Recorded as Stolophorus purpureus.
1964	Spec - BPBM-I 25806	
1973	Ref - Evans et al., 1974	Recorded as Stolephorus purpureus Fowler.
1978	Ref - Grovhoug, 1979	Recorded as Stolephorus purpureus Fowler.
1986	Ref - Somerton et al., 1993	Recorded as Encrasicholina purpureus.
1987	Ref - AECOS, 1987	Recorded as Stolephorus purpureus Fowler.
1993	Ref - Brock, 1994	Recorded as Stolephorus purpureus.
1994	Ref - Brock, 1995	Recorded as Stolephorus purpureus.

Legacy Project - Species Report (Cont.)

Order: MYCTOPHIFORMES
Family: SYNODONTIDAE
Genus: *Saurida*
Saurida gracilis **(Quoy & Gaimard, 1824)**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1993	Ref - Brock, 1994	
2006	Ref - Smith et al., 2006	

Saurida nebulosa **Valenciennes, 1849**

1992	Spec - BPBM-I 35396	

Genus: *Synodus*
Synodus sp.

1996	Legacy Project (Coles et al., 1997)	

Synodus variegatus **(Lacépede, 1803)**

1973	Ref - Evans et al., 1974	

Order: GONORYNCHIFORMES
Family: CHANIDAE
Genus: *Chanos*
Chanos chanos **(Forsskål, 1775)**

1973	Ref - Evans et al., 1974	Recorded as Chanos.
1978	Ref - Grovhoug, 1979	Recorded as Chanos.
1987	Ref - Brewer & Assoc., 1987	Recorded as Chanos.
1993	Ref - Brock, 1994	Recorded as Chanos.
1994	Ref - Brock, 1995	Recorded as Chanos.
2006	Ref - Smith et al., 2006	

Order: LOPHIIFORMES
Family: ANTENNARIIDAE
Genus: *Antennarius*
Antennarius commersoni

1932	Spec - BPBM-I 3491	Near coral dock.

Antennarius pictus **(Shaw & Nodder, 1974)**

1923	Spec - BPBM-I 5144	
1973	Ref - Evans et al., 1974	Recorded as chironectes Lacepede.

Genus: *Antennatus*
Antennatus tuberosus

1962	Spec - BPBM-I 25788	

Order: GADIFORMES
Family: CARAPODIDAE
Genus: *Carapus*
Carapus margaritiferae **(Rendahl, 1921)**

1973	Ref - Evans et al., 1974	

Order: ATHERINIFORMES
Family: ATHERINIDAE
Genus: *Atherinomorus*
Atherinomorus insularum **(Jordan and Evermann, 1903)**

2006	Ref - Smith et al., 2006	Recorded as Pranesus insularum.

Family: BELONIDAE
Genus: *Tylosurus*
Tylosurus crocodilus **(Peron & LeSueur, 1821)**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	

Legacy Project - Species Report (Cont.)

Family: CYPRINODONTIDAE

Genus: *Fundulus*

Fundulus grandis **Baird & Girard, 1853 Introduced.**

1905	Ref - Brock, 1960	
1905	Ref - Maciolek, 1984	
1907	Ref - Van Dine, 1907	
1987	Ref - Randall, 1987	

Family: HEMIRAMPHIDAE

Genus: *Hemiramphus*

Hemiramphus depauperatus **Lay & Bennett, 1839**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1987	Ref - Brewer & Assoc., 1987	

Family: POECILIIDAE

Unidentified Poeciliidae

1996	Legacy Project (Coles et al., 1997)	

Genus: *Gambusia*

Gambusia affinis **(Baird & Girard, 1853) Introduced.**

1905	Ref - Brock, 1960	
1905	Ref - Maciolek, 1984	
1907	Ref - Van Dine, 1907	
1987	Ref - Randall, 1987	

Genus: *Poecilia*

Poecilia latipinna **(LeSueur) Introduced.**

1905	Ref - Brock, 1960	Recorded as Mollienesia latipina.
1905	Ref - Maciolek, 1984	Recorded as Mollienesia latipina.
1907	Ref - Van Dine, 1907	Recorded as Poecilia latipina.
1973	Ref - Evans et al., 1974	
1987	Ref - Randall, 1987	Recorded as Poecilia latipina.

Order: POLYMIXIIFORMES

Family: HOLOCENTRIDAE

Genus: *Myripristis*

Myripristis amaena **(Castelnau, 1873)**

2006	Ref - Smith et al., 2006	Recorded as Myripristis amaenus.

Myripristis berndti **Jordan & Evermann, 1903**

1973	Ref - Evans et al., 1974	Recorded as murdjan (Forsskal).
1978	Ref - Grovhoug, 1979	Recorded as murdjan (Forsskal).
1996	Legacy Project (Coles et al., 1997)	

Genus: *Neoniphon*

Neoniphon sammara **(Forsskål, 1775)**

1973	Ref - Evans et al., 1974	Recorded as Flammeo sammara (Forsskal).
1978	Ref - Grovhoug, 1979	Recorded as Flammeo sammara (Forsskal).

Genus: *Sargocentron*

Sargocentron diadema **(Lacepede, 1802) Hawaiian name(s): 'ala 'ihi kalaloa.**

1996	Spec - BPBM-I 37326	NE side of West Loch channel.

Sargocentron punctatissimum **(Cuvier in Cuvier and Valenciennes, 1829)**

2006	Ref - Smith et al., 2006	Recorded as Adioryx lacteoguttatus.
2006	Ref - Smith et al., 2006	

Order: GASTEROSTEIFORMES

Family: AULOSTOMIDAE

Genus: *Aulostomus*

Aulostomus chinensis **(Linnaeus, 1766)**

1973	Ref - Evans et al., 1974	

1996 Legacy Project (Coles et al., 1997)

Family: SYNGNATHIDAE

Genus: *Doryrhamphus*

Doryrhamphus exisis **Kaup, 1856**

1996 Legacy Project (Coles et al., 1997)

Genus: *Hippocampus*

Hippocampus kuda **Bleeker, 1852**

1924 Spec - BPBM-I 3787

2007 Ref - Brock, 2007

Genus: *Micrognathus*

Micrognathus edmondsoni? **(Pietschmann, 1930)**

1973 Ref - Evans et al., 1974

Order: SCORPAENIFORMES

Family: SCORPAENIDAE

Genus: *Brachirus*

Brachirus barberi **(Eschmeyer & Randall)**

1973 Ref - Evans et al., 1974

Genus: *Scorpaenopsis*

Scorpaenopsis diabolus **(Cuvier, 1829)**

1973 Ref - Evans et al., 1974 Recorded as S. diabolus (Eschmeyer & Anderson).

Scorpaenopsis gibbosa **(Bloch & Snyder, 1801)**

1979 Ref - AECOS, 1979 Off Pearl Harbor. Recorded as S. gibbosus.

Genus: *Sebastapistes*

Sebastapistes coniorta **(Jenkins, 1903)**

1973 Ref - Evans et al., 1974 Recorded as Scorpaena coniorta (Jenkins).

Order: PERCIFORMES

Family: ACANTHURIDAE

Genus: *Acanthurus*

Acanthurus blochi **(Cuvier, 1829) Indigenous. Common name(s): Ringtail Surgeonfish; Hawaiian name(s): pualu.**

1996 Legacy Project (Coles et al., 1997)

2006 Ref - Smith et al., 2006 Recorded as Acanthurus blochii.

2008 This Project

Acanthurus dussumieri **Cuvier & Valenciennes, 1835 Indigenous. Common name(s): Eyestripe Surgeonfish; Hawaiian name(s): palani.**

1973 Ref - Evans et al., 1974

1973 Ref - McCain, 1974

1973 Ref - McCain, 1975

1978 Ref - Grovhoug, 1979

1986 Ref - Lenihan, 1990

2006 Ref - Smith et al., 2006

2008 This Project

Acanthurus guttatus **Bloch & Schneider, 1801**

1996 Legacy Project (Coles et al., 1997)

Acanthurus leucopareius **(Jenkins, 1903) Indigenous. Common name(s): Whitebar Sugeonfish; Hawaiian name(s): māikoko.**

2008 This Project

Acanthurus mata **(Cuvier, 1829)**

1973 Ref - Evans et al., 1974

1973 Ref - McCain, 1974

1973 Ref - McCain, 1975

1978 Ref - Grovhoug, 1979

1986 Ref - Lenihan, 1990

Legacy Project - Species Report (Cont.)

Acanthurus nigrofuscus **(Forsskål, 1775)**

1996	Legacy Project (Coles et al., 1997)	

Acanthurus olivaceus **(Bloch & Schneider, 1801)**

1973	Ref - Evans et al., 1974	

Acanthurus triostegus **(Linnaeus, 1758) Indigenous. Common name(s): Convict Tang; Hawaiian name(s): palani.**

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1979	Ref - AECOS, 1979	Off Pearl Harbor. Recorded as A. trigostegus sandvicensis.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	This Project	
2008	This Project	

Acanthurus xanthopterus **Cuvier & Valenciennes, 1835**

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Genus: *Ctenochaetus*

Ctenochaetus strigosus **(Bennett, 1828)**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Genus: *Naso*

Naso brevirostris **(Valenciennes, 1835)**

1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	

Naso lituratus **(Forster and Schneider, 1801)**

2006	Ref - Smith et al., 2006	

Naso unicornis **(Forsskål, 1775) Indigenous. Common name(s): Bluespine Unicornfish; Hawaiian name(s): kala.**

1973	Ref - Evans et al., 1974	
1986	Ref - Lenihan, 1990	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	

Genus: *Zanclus*

Zanclus cornutus **(Linnaeus, 1758) Indigenous. Common name(s): Moorish Idol; Hawaiian name(s): kīhikihi.**

1973	Ref - Evans et al., 1974	Recorded as canescens (Linnaeus).
1978	Ref - Grovhoug, 1979	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Legacy Project - Species Report (Cont.)

Genus: *Zebrasoma*

Zebrasoma flavescens **(Bennett, 1828) Indigenous. Common name(s): Yellow Tang; Hawaiian name(s): lau-ī-pala.**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	This Project	

Zebrasoma veliferum **(Bloch, 1797)**

1973	Ref - Evans et al., 1974	
1986	Ref - Lenihan, 1990	
2006	Ref - Smith et al., 2006	

Family: APOGONIDAE

Genus: *Apogon*

Apogon sp.

1986	Ref - Lenihan, 1990	

Apogon kallopterus **Bleeker, 1856**

1973	Ref - Evans et al., 1974	Recorded as snyderi, Jordan and Evermann.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Apogon snyderi **Jordan & Evermann, 1903**

1978	Ref - Grovhoug, 1979	

Genus: *Foa*

Foa brachygramma **(Jenkins, 1903) Hawaiian name(s): 'upapalu.**

1973	Ref - Evans et al., 1974	Recorded as brachygrammus (Jenkins).
1978	Ref - Grovhoug, 1979	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Spec - BPBM-I 37322	West Loch; Oyster Reef.
2006	Ref - Smith et al., 2006	

Family: BLENNIIDAE

Unidentified Blenniidae

1987	Ref - Brewer & Assoc., 1987	
2008	This Project	

Genus: *Cirripectus*

Cirripectus vanderbilti **(Fowler, 1938)**

1996	Legacy Project (Coles et al., 1997)	

Genus: *Entomacrodus*

Entomacrodus marmoratus **(Bennett, 1928)**

1973	Ref - Evans et al., 1974	

Genus: *Exallias*

Exallias sp.

1994	Ref - Brock, 1995	

Exallias brevis **(Kner, 1868)**

1973	Ref - Evans et al., 1974	

Genus: *Omobranchus*

Omobranchus elongatus **(Peters, 1855)**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1996	Spec - BPBM-I 37320	NE side of West Loch channel.

Legacy Project - Species Report (Cont.)

Family: CARANGIDAE

Genus: *Carangoides*

Carangoides gymnostethoides **Bleeker, 1852**

1973 Ref - Evans et al., 1974

Genus: *Caranx*

Caranx sp.

1996 Legacy Project (Coles et al., 1997)

Caranx ignobilis **(Forsskål, 1775)**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
2006 Ref - Smith et al., 2006

Caranx mate **Cuvier & Valenciennes, 1833**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979

Caranx melampygus **Cuvier & Valenciennes, 1833**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1987 Ref - Brewer & Assoc., 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)

Caranx sexfasciatus **Quoy & Gaimard, 1825**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979

Genus: *Decapterus*

Decapterus macarellus **(Cuvier, 1833)**

2006 Ref - Smith et al., 2006

Genus: *Gnathanodon*

Gnathanodon speciosus **(Forsskål, 1775) Indigenous. Common name(s): Golden Trevally; Hawaiian name(s): ulua pa‘opa‘o.**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Genus: *Scomberoides*

Scomberoides laysan **(Forsskål, 1775)**

1993 Ref - Brock, 1994 Recorded as Scrombroides laysan.
1994 Ref - Brock, 1995 Recorded as Scrombroides laysan.

Scomberoides sanct-petri **(Cuvier, 1831)**

1973 Ref - Evans et al., 1974

Legacy Project - Species Report (Cont.)

Family: CHAETODONTIDAE

Genus: *Chaetodon*

Chaetodon auriga **Forsskål, 1775 Indigenous. Common name(s): Thrreadfin Butterflyfish.**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	This Project	
2008	This Project	

Chaetodon ephippium **Cuvier, 1831**

1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Chaetodon lineolatus **Cuvier, 1831**

1993	Ref - Brock, 1994	

Chaetodon lunula **(Lacépede, 1802)**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	

Chaetodon lunulatus **Quoy and Gaimard, 1825**

2006	Ref - Smith et al., 2006	

Chaetodon miliaris **Quoy & Gaimard, 1824**

1973	Ref - Evans et al., 1974	
1978	Ref - Grovhoug, 1979	
1996	Legacy Project (Coles et al., 1997)	

Genus: *Forcipiger*

Forcipiger flavissimus **Jordan & McGregor, 1898**

1996	Legacy Project (Coles et al., 1997)	

Genus: *Heniochus*

Heniochus diphreutes **Jordan, 1903**

1973	Ref - Evans et al., 1974	Recorded as acuminatus (Linnaeus).

Family: Cheilodactylidae

Genus: *Goniistius*

Goniistius vittatus **(Garrett, 1864)**

2006	Ref - Smith et al., 2006	Recorded as Cheilodactylus vittatus.

Family: CICHLIDAE

Genus: *Oreochromis*

Oreochromis mossambicus **(Peters, 1852) Introduced.**

1973	Ref - Evans et al., 1974	Recorded as Tilapia mossambica (Peters).
1973	Ref - McCain, 1974	Recorded as Tilapia mossambica.
1973	Ref - McCain, 1975	Recorded as Tilapia mossambica.
1987	Ref - AECOS, 1987	Recorded as Sarotherodon mossambica (Peters).
1994	Ref - Brock, 1995	Recorded as Tilapia mossambica (Peters).
1996	Legacy Project (Coles et al., 1997)	

Genus: *Sarotherodon*

Sarotherodon melanopleura **(Rüppell, 1852)**

1993	Ref - Brock, 1994	Recorded as Tilapia melanopleura.

1994 Ref - Brock, 1995 Recorded as Tilapia melanopleura.

Sarotherodon melanotheron **Ruppell, 1852**

1987 Ref - Randall, 1987 Recorded as Tilapia melanotheron.
1996 Spec - BPBM-I 37324 Middle Loch; under hull of U.S.S. "Machinist" Floating Drydock.
2006 Ref - Smith et al., 2006 Recorded as Tilapia melanotheron.
2007 Ref - Brock, 2007 Recorded as Tilapia melanotheron.

Family: GOBIIDAE

Unidentified Gobiidae

1996 Legacy Project (Coles et al., 1997)

Genus: *Asterropteryx*

Asterropteryx semipunctatus **Rüppell, 1821**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Spec - BPBM-I 37315 Middle Loch; W side of Waiawa Peninsula; near pier (Pan Am Clipper Dock); along shoreline.
1996 Spec - BPBM-I 37316 W side of Middle Loch channel.
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007

Genus: *Bathygobius*

Bathygobius cocosensis **(Bleeker, 1854) Hawaiian name(s): 'o'opu 'ohune.**

1973 Ref - Evans et al., 1974 Recorded as fuscus (Ruppell).
1986 Ref - Lenihan, 1990 Recorded as B. fuscus (Ruppell).
1993 Ref - Brock, 1994 Recorded as B. fuscus.
1994 Ref - Brock, 1995 Recorded as B. fuscus.
1996 Spec - BPBM-I 37313 Rainbow Bay Marina; docks and shoreline.
1996 Spec - BPBM-I 37317 Sheet piling in thermal discharge from Hawaiian Electric Company (HECO) Waiau Plant.
1996 Spec - BPBM-I 37319 Middle Loch; on wooden pilings near U.S.S. "Machinist" Floating Drydock.
1996 Spec - BPBM-I 37321 Middle Loch; on hull of U.S.S. "Machinist" Floating Drydock.

Bathygobius cotticeps **Steindachner, 1880**

1987 Ref - AECOS, 1987

Bathygobius fuscus **(Rüppell, 1830)**

2006 Ref - Smith et al., 2006

Genus: *Ctenogobius*

Ctenogobius tongarevae **(Fowler, 1927)**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Genus: *Eviota*

Eviota epiphanes **Jenkins, 1903**

1996 Spec - BPBM-I 37314 N side of entrance channel.

Genus: *Gnatholepis*

Gnatholepis anjerensis **Bleeker, 1850**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Genus: *Mugilogobius*

Mugilogobius cavifrons **(Weber, 1909)**

1991 Spec - BPBM-I 34997 Drainage area E of Blaisdell Park.

Mugilogobius parvus **(Oshima, 1919) Introduced.**

1987 Ref - Randall et al., 1993
1994 Ref - Eldredge, 1994

Legacy Project - Species Report (Cont.)

Genus: *Opua*

Opua nephodes **Jordan, 1925**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Genus: *Oxyurichthys*

Oxyurichthys lonchotus **(Jenkins, 1903)**

1973 Ref - Evans et al., 1974

Genus: *Psilogobius*

Psilogobius mainlandi **Baldwin, 1972**

1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Family: KUHLIIDAE

Genus: *Kuhlia*

Kuhlia sandvicensis **(Steindachner, 1876) Indigenous. Common name(s): Hawaiian Flagtail; Hawaiian name(s): āholehole.**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1987 Ref - Brewer & Assoc., 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Family: KYPHOSIDAE

Genus: *Kyphosus*

Kyphosus bigibbus **(Lacépede, 1802)**

1973 Ref - Evans et al., 1974 Recorded as cinerascens (Forsskal).

Genus: *Microcanthus*

Microcanthus strigatus **Cuvier & Valenciennes, 1831**

1973 Ref - Evans et al., 1974
1996 Legacy Project (Coles et al., 1997)

Family: LABRIDAE

Genus: *Anampses*

Anampses cuvieri? **Quoy & Gaimard, 1824**

1979 Ref - AECOS, 1979 Off Pearl Harbor.

Genus: *Cheilinus*

Cheilinus bimaculatus **Valenciennes, 1840**

1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Genus: *Cheilio*

Cheilio inermis **(Forsskål, 1775)**

1973 Ref - Evans et al., 1974
1986 Ref - Lenihan, 1990

Genus: *Coris*

Coris flavovita **Bennett, 1929**

1996 Legacy Project (Coles et al., 1997)

Genus: *Gomphosus*

Gomphosus varius **Lacépede, 1801**

1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Legacy Project - Species Report (Cont.)

Genus: *Labroides*

Labroides phthirophagus **Randall, 1958 Indigenous. Common name(s): Cleaner Wrasse.**

1973	Ref - Evans et al., 1974	
1996	Legacy Project (Coles et al., 1997)	
2008	This Project	

Genus: *Oxycheilinus*

Oxycheilinus unifasciatus **(Streets, 1877)**

2006	Ref - Smith et al., 2006	

Genus: *Stethojulis*

Stethojulis balteata **(Quoy & Gaimard, 1824) Indigenous. Common name(s): Belted Wrasse; Hawaiian name(s): ōmaka.**

1973	Ref - Evans et al., 1974	Recorded as balteatus (Quoy and Gaimard).
1978	Ref - Grovhoug, 1979	
1996	Legacy Project (Coles et al., 1997)	
2007	This Project	

Genus: *Thalassoma*

Thalassoma duperrey **(Quoy & Gaimard, 1824) Indigenous. Common name(s): Saddle Wrasse; Hawaiian name(s): hīnālea lau-wili.**

1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2008	This Project	

Thalassoma umbrostigma **(Rüppell, 1838)**

1979	Ref - AECOS, 1979	Off Pearl Harbor.

Family: LUTJANIDAE

Genus: *Lutjanus*

Lutjanus fulvus **(Bloch & Schneider) Introduced. Common name(s): Blacktail Snapper; Hawaiian name(s): to‘au.**

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	
1996	Spec - BPBM-I 37323	West Loch; Oyster Reef.
1996	Legacy Project (Coles et al., 1997)	
2006	Ref - Smith et al., 2006	
2007	This Project	
2008	This Project	

Family: MUGILIDAE

Genus: *Chelon*

Valamugil engli **(Bleeker, 1858)**

1993	Ref - Brock, 1994	Recorded as Chelon engli.
1994	Ref - Brock, 1995	Recorded as Chelon engli.

Genus: *Moolgarda*

Moolgarda engeli **(Bleeker, 1858)**

2006	Ref - Smith et al., 2006	Recorded as Vulamugil engeli.

Genus: *Mugil*

Mugil cephalus **Linnaeus, 1758**

1973	Ref - Evans et al., 1974	
1973	Ref - McCain, 1974	
1973	Ref - McCain, 1975	
1978	Ref - Grovhoug, 1979	
1986	Ref - Lenihan, 1990	
1993	Ref - Brock, 1994	
1994	Ref - Brock, 1995	

1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Family: MULLIDAE

Genus: *Mulloidichthys*

Mulloidichthys auriflamma **Forsskål, 1775**
1973 Ref - Evans et al., 1974

Mulloidichthys flavolineatus **(Lacépede, 1801)**
1973 Ref - Evans et al., 1974 Recorded as samoensis (Gunther).
1978 Ref - Grovhoug, 1979 Recorded as samoensis (Gunther).
1986 Ref - Lenihan, 1990 Recorded as M. samoensis (Gunther).
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Mulloidichthys vanicolensis **Valenciennes, 1831 Indigenous. Common name(s): Yellowfin Goatfish; Hawaiian name(s): weke ‘ula.**
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Genus: *Parupeneus*

Parupeneus bifasciatus **(Lacepède, 1802)**
2006 Ref - Smith et al., 2006

Parupeneus cyclostomus **(Lacepède, 1801)**
2006 Ref - Smith et al., 2006

Parupeneus multifasciatus **(Quoy and Gaimard, 1825) Indigenous. Common name(s): Manybar Goatfish; Hawaiian name(s): moana.**
2007 This Project

Parupeneus mutifasciatus **Quoy & Gaimard, 1824**
1996 Legacy Project (Coles et al., 1997)

Parupeneus pleurostigma **(Bennett, 1830)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Parupeneus porphyreus **Jenkins, 1903**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Genus: *Upeneus*

Upeneus arge **Jordan & Evermann, 1903**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995

Upeneus taeniopterus **(Cuvier, 1829) Hawaiian name(s): weke pahulu; weke pueo.**
1996 Spec - BPBM-I 37325 NE side of West Loch channel.

Upeneus vittatus **(Forsskål, 1775)**
1992 Spec - BPBM-I 35395
1993 Spec - BPBM-I 37064

Legacy Project - Species Report (Cont.)

Family: POLYNEMIDAE
Genus: *Polydactylus*
Polydactylus sexfilis **(Cuvier & Valenciennes, 1831)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Family: POMACANTHIDAE
Genus: *Pomacanthus*
Pomacanthus imperator **(Bloch, 1787)**
2006 Ref - Smith et al., 2006

Family: POMACENTRIDAE
Genus: *Abudefduf*
Abudefduf abdominalis **(Quoy & Gaimard, 1824) Indigenous. Common name(s): Hawaiian Sergeant; Hawaiian name(s): mamo.**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 This Project
2008 This Project

Abudefduf sordidus **(Forsskål, 1775)**
1973 Ref - Evans et al., 1974
1986 Ref - Lenihan, 1990
2006 Ref - Smith et al., 2006

Genus: *Dascyllus*
Dascyllus albisella **Gill, 1862 Indigenous. Common name(s): Hawaiian Dascyllus; Hawaiian name(s): mamo.**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Family: PRIACANTHIDAE
Genus: *Heteropriacanthus*
Heteropriacanthus cruentatus **(Lacepede, 1801)**
1973 Ref - Evans et al., 1974 Recorded as Priacanthus cruentatus (Lacepede).
1986 Ref - Lenihan, 1990 Recorded as Priacanthus cruentatus (Lacepede).
2006 Ref - Smith et al., 2006

Family: SCARIDAE
Genus: *Calotomus*
Calotomus carolinus **(Valenciennes in Cuvier and Valenciennes, 1840)**
2006 Ref - Smith et al., 2006

Calotomus spinidens **(Quoy & Gaimard, 1824)**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979

Genus: *Chlorurus*
Chlorurus psittacus **(Forsskål, 1775)**
1996 Spec - BPBM-I 37327 NE of Ford Island.
2006 Ref - Smith et al., 2006 Recorded as Scarus psittacus.

Chlorurus sordidus **(Forsskål, 1775) Hawaiian name(s): uhu.**
1973 Ref - Evans et al., 1974 Recorded as Scarus sordidus Forsskal.

1993 Ref - Brock, 1994 Recorded as Scarus sordidus.
1994 Ref - Brock, 1995 Recorded as Scarus sordidus.
2006 Ref - Smith et al., 2006 Recorded as Scarus sordidus.
2007 Ref - Brock, 2007 Recorded as Scarus sordidus.

Genus: *Scarus*
Scarus sp. **Indigenous. Common name(s): Parrotfish.**
1973 Ref - Evans et al., 1974 juvenile.
1986 Ref - Lenihan, 1990
1996 Legacy Project (Coles et al., 1997)
2008 This Project

Scarus rubroviolaceus **Bleeker, 1849**
2006 Ref - Smith et al., 2006

Family: SPHYRAENIDAE
Genus: *Sphyraena*
Sphyraena barracuda **(Walbaum, 1792)**
1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1987 Ref - AECOS, 1987
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006

Order: PLEURONECTIFORMES
Family: BOTHIDAE
Genus: *Bothus*
Bothus pantherinus **(Rüppell, 1830)**
1973 Ref - Evans et al., 1974

Order: TETRAODONTIFORMES
Family: DIODONTIDAE
Genus: *Diodon*
Diodon holocanthus **Linnaeus, 1758**
1973 Ref - Evans et al., 1974

Diodon hystrix **Linnaeus, 1758 Indigenous. Common name(s): Spiny Balloonfish.**
1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1979 Ref - AECOS, 1979 Off Pearl Harbor. Recorded as D. hysterix.
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2008 This Project

Family: MONACANTHIDAE
Genus: *Pervagor*
Pervagor spilosoma **(Lay & Bennett, 1839)**
1973 Ref - Evans et al., 1974

Family: OSTRACIIDAE
Genus: *Lactoria*
Lactoria fornasini **(Bianconi, 1846)**
1996 Legacy Project (Coles et al., 1997)

Genus: *Ostracion*
Ostracion meleagris **(Shaw and Nodder, 1796) Indigenous. Common name(s): Spotted Boxfish; Hawaiian name(s): moa.**
2008 This Project

Legacy Project - Species Report (Cont.)

Ostracion meleagris camurum **(Jenkins, 1901)**

1973 Ref - Evans et al., 1974
1978 Ref - Grovhoug, 1979
1996 Legacy Project (Coles et al., 1997)

Family: TETRAODONTIDAE

Genus: *Arothron*

Arothron sp. **Hawaiian name(s): makimaki.**

1949 Spec - BPBM-I 25886
1996 Spec - BPBM-I 37318 Sheet piling in thermal discharge from Hawaiian Electric Company (HECO) Waiau Plant.

Arothron hispidus **(Linnaeus, 1758) Indigenous. Common name(s): Stripebelly Puffer; Hawaiian name(s): ‘o‘opu-hue.**

1973 Ref - Evans et al., 1974
1973 Ref - McCain, 1974
1973 Ref - McCain, 1975
1978 Ref - Grovhoug, 1979
1986 Ref - Lenihan, 1990
1993 Ref - Brock, 1994
1994 Ref - Brock, 1995
1996 Legacy Project (Coles et al., 1997)
2006 Ref - Smith et al., 2006
2007 Ref - Brock, 2007
2007 This Project
2008 This Project

Genus: *Canthigaster*

Canthigaster coronata **(Vaillant & Sauvage, 1875)**

1973 Ref - Evans et al., 1974 Canthigaster coronatus (Randall, P.C.).

Canthigaster jactator **(Jenkins, 1901) Indigenous. Common name(s): Whitespotted Toby.**

1973 Ref - Evans et al., 1974
2008 This Project

Class: REPTILIA

Family: Chelonidae

Genus: *Chelonia*

Chelonia mydas **(Linnaeus, 1758)**

2007 Ref - Brock, 2007